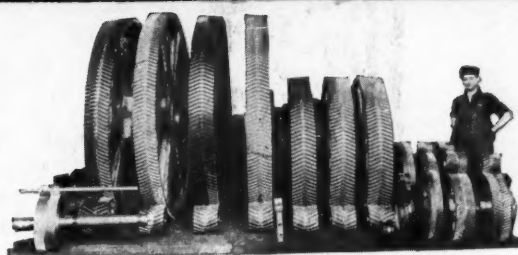
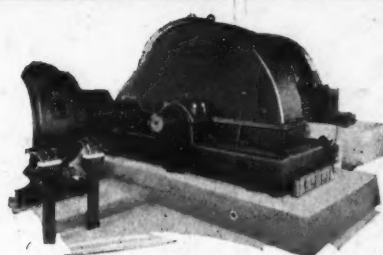


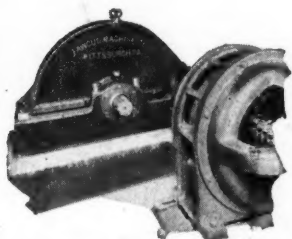
Fawcus Herringbone Gear Hoist Drive with Cover Removed.



Fawcus Cut Herringbone Gears; All Sizes.



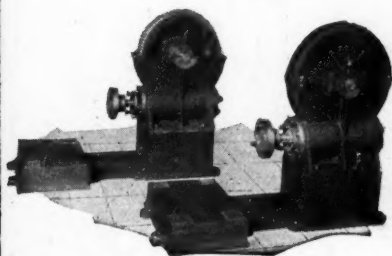
Fawcus Herringbone Gear Drive Installation on Hoist.



Fawcus Herringbone Gear Fan Drive Connected to Motor.



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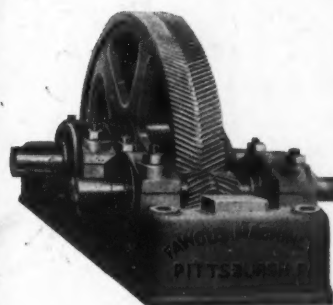
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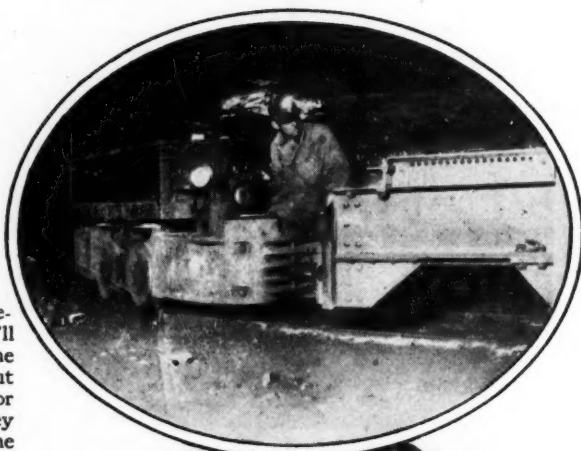


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With which is consolidated "The Colliery Engineer" and "Mines and Minerals"
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Our Issue of Aug. 12

How \$200 and a good hoist engineer saves one company \$2,500 yearly

The management at Valier, Ill., is making steady progress in its broad program of cost reduction. Concerted effort in this direction began early in 1923 and much of what was accomplished during the first two years has already been told. (See *Coal Age* of Nov. 5, 1925). Two later cost-cutting achievements will be described in the forthcoming issue of *Coal Age*. These are all the more notable because they are attained with the mine operating far below its capacity. Other examples of substantial economies and the means by which they have been effected will be described in later issues.

How Nova Scotia mines are introducing longwall to meet the problems of great depth

Way down under the sea and under the earth's crust, as deep, perhaps, as any of the bituminous mines of the United States, are the workings of the British Empire Steel Corporation. In these mines several methods of mining by longwall or long face are being tried. All, however, are on the advancing system, with roads on the heaving bottom and under the broken top of extracted areas. It will be interesting to watch their experience frankly copied from England. Meantime we in the United States will be learning about the value of our methods of retreat, though here the depths as a rule are not so profound. J. J. MacDougall describes next week the new Sydney Mines' methods.

How an attempt is made to overtax anthracite operations

An authority on assessments and taxes describes the situation in the anthracite fields where some concerns pay in state taxes \$1 for every ton extracted and where the average is over 20c. per ton shipped.

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Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

Volume 30

NEW YORK, AUGUST 5, 1926

Number 6

Do Unto Others

RECENTLY a mine official expressed his disgust at the action of a certain company which instructed a man to visit the mines of a number of corporations and to investigate their methods and then withheld information concerning its own work.

What is to be gained by refusing information? Coal mining can hardly be classed as an industry in which production methods can be kept secret. Most of the industries have promoted and fostered associations for the exchange of information and coal mining has not been behind hand in this practice.

Fortunately certain large producers, which a few years ago would allow little or no publicity, now part freely with information. They have learned the value of pooling experience.

Shooting with an Inert Gas

ORDINARY EXPLOSIVES as used in the mines leave much to be desired. Smoke, flame, a shattering effect on the coal, a jarring action on the roof and a liability to premature ignition are among their shortcomings. Furthermore, use of the ordinary explosive in most cases entails some delay, inasmuch as it is necessary to wait for smoke to clear away before work can be resumed at the face.

Various substitutes for explosives have been tried from time to time. Probably the best known of these is the hydraulic cartridge. In its action, however, this device would appear to be more nearly parallel to the wedge than to the explosive. The use of coal-loading machinery will be greatly facilitated by the adoption of means to bring down coal that will permit continuous or nearly continuous operation of equipment.

Out in southern Illinois some extremely interesting experiments have been conducted during the past few months in the use of liquid carbon dioxide as a means for bringing down coal. Many of the results so far attained have been highly encouraging. This substance is not an explosive in any sense, although the results secured from its use in many respects resemble those of an explosive. Its action appears to be more like that of a "pneumatic jack" than anything else. In other words the coal is pushed down rather than disrupted and practically all shattering effect is absent.

Carbon dioxide, as an "explosive" depends for its efficiency upon a sufficient quantity of heat being supplied to it to enable it to gasify almost instantaneously. The liquid charge is loaded into a steel bomb which also contains what might be termed a "primer" composed of certain chemicals and an electric heating element. The primer is separated from the charge proper by a steel diaphragm, and the end of the bomb is closed in the same manner.

Loading a hole with a carbon-dioxide bomb is similar to loading with either a permissible explosive or black powder except that bugdust or any other inflammable material may be used, as stemming, with perfect safety. The necessary detonating current is purposely made so high that the mine power circuits must be utilized. There is consequently no danger of detonation from stray currents within the workings.

Upon firing, the gas pressure evolved first forces the diaphragm plug out of the bomb and then brings down the coal. The action is far less violent than that of even a slow explosive, and the roof is not jarred to any extent. Naturally no smoke or flame is evolved, and experiments so far made show only an almost negligible vitiation of the mine atmosphere. It has also proved perfectly safe for a person to stand near by when a shot is made and watch the face come down. The percentage of slack, or 1½-in. screenings, in a 5- to 7-ft. bed of coal has been decreased to approximately 20 per cent. This includes the bugdust.

Those who have developed this process to its present status assert that it will cost about the same as present-day permissible explosive, that it will permit mining machines to operate during a maximum percentage of the time as alternate sides of a room or other face may be "shot" successively, that its action is a true "heave" resulting in a maximum proportion of lump, that it can be employed for solid shooting and that no smoke or flame and only a small quantity of inert gas is evolved. In other words it is claimed that this new "explosive" gives a far better product and costs no more than explosives now in use. But above all other considerations it is believed to be entirely safe both to handle and use.

Earth's Price

"EARTH GETS its price for what earth gives us." Every commodity that man uses, every article of clothing that he wears, every morsel of food that he consumes, figuratively if not literally, costs its drop of blood. The human race demands bread. Consequently the farmer must labor in the hot sun to raise the wheat from which it is produced. He thus lays himself liable to many dangers—sunstroke, frightened or vicious horses, farm machinery and the like. Every year some succumb to these ever-present perils.

Similarly, civilization demands coal and the miner braves the dangers of subtle gas, falls of roof, runaway cars, electric shock, explosives and all the other perils with which every mining man is all too familiar. Every year industry takes its toll in human life and human suffering. Earth's price appears to be inevitable; man has never yet succeeded in avoiding it entirely. He may, however, by the exercise of care and intelligence appreciably reduce the tribute exacted by Fate.

All safety measures, whether in the mine, in the factory or on the farm, must necessarily aim at the protection of the individual. But the success of safety measures is not indexed by the absolute number of men lost or saved—neither is it indicated by the ratio of accidents or fatalities to the number of men employed. In a true and logical sense the only criterion by which the success or failure of industrial safety measures and practices may be judged is the ratio between accident and unit output. So far as the coal mines are concerned this is usually taken as the number of lives lost or serious mishaps sustained per million tons of coal produced.

In England to a far greater extent than in this country the government department that holds jurisdiction over the coal mining industry has been made unduly scientific—that is, scientific to the point of being impractical. Thus the Home Office has laid down arbitrary rules and regulations concerning the use of machinery that are so broad, sweeping and drastic as to practically throttle progress and forbid a cheapening of the mine product. It is believed by some who have studied Britain's coal problem that that country might well adopt certain equipment and practices that have been developed and have become almost standards on this side of the Atlantic, but which are forbidden by stringent regulations over there. This refers particularly to the use of electricity and electrical appliances underground.

A Right Modicum of Ingenuity

MANY A MAN around a mine has used his wits to design and construct mine equipment and "gone the manufacturer one better," but more have made merely a makeshift that did the job ill and caused accidents, loss of time, uncertainty of operation and "went the manufacturer one worse." The little "dodads" and "kinks" that show how, at the expenditure of \$10.78, to make in the mine workshop some one thing that the manufacturer will deliver at \$11.35 a dozen, get the individual nowhere unless indeed he works for one of those coal companies—and there are many—which prefer to pay \$75 for labor rather than \$7.50 for the purchase of a product identical to that which the labor would make at the mine.

The manufacturer has his own experience; he has the suggestions of his engineers; he has the ideas of his salesmen; and above all, he has the advice of his customers. Out of them all he finds a way to make a fair profit. His engineers usually put into the device all the thought, ingenuity and experience they possess; his factory chiefs mull over it and add their manufacturing experience and the device or machine starts on its way a child more favored by circumstance than one that springs full-armed out of the mine mechanic's brain. Then the manufacturer gives it months or even years of test. He refuses to guarantee its performance. He encourages complaints. He watches it through his engineers and at the end he puts it on a production basis and places it in his regular line of products. It is then cheaply manufactured. Let it not be doubted that perhaps, by genius or chance, a better type of machine or device may be planned and a better means of manufacture may be devised; but let the man who comes to the conclusion that he wants to make the article in the mine shop form a clear vision in his mind that such manufacture can pay only if the device is

better, the wage he pays is lower, the means he employs in the manufacture is superior to that of the factory, or the equipment can be evolved out of second-hand machinery of like nature.

Sometimes all of these conditions are present or at least some of them, and then perhaps he does well to make his own equipment. It is true, too, that some needs are so confined and special, that the manufacturer cannot afford to cater to them. But by and large "homemade" is apt to mean "expensively manufactured and ineffective" rather than "inexpensive and efficient."

White Coal Versus Black Coal

"POWER DEVELOPMENT of the future will be steam and not hydro." This statement was recently made by Frank T. Griffith, president of the Portland Power Co. at the National Electric Light Association convention. Back of it is the implication that coal is the mainstay of future power development. California, which is and has been a conspicuous leader in hydro-electric development, is now largely dependent on steam-power reserves to maintain its power requirements. Temporarily fuel oil is being used, but it is evident that petroleum resources are being consumed at a prodigious rate, and eventually crude oil and products will be utilized for other purposes than power production. Uncertain rainfall over a period of years has brought into prominence the need for water storage. Where such storage reservoirs can be created, their construction involves an increase in capital input. Steam power can be in many instances installed for a lower cost than water storage. The economics of the situation thus favor steam if more power is needed.

The fuel situation in the West is such that coal operators are justified in seeking to have the railroads reduce the cost of haulage for the advantage of both. Railroads have stimulated locomotive development and have, by increasing the size and economy of locomotives, made a reduction in their haulage costs. An increase in tonnage will result in lower overhead costs per unit of freight hauled. The important potential source of increased tonnage is coal. Both miners and railroads should be alive to the necessity of lowering the price of their product delivered at large cities so that power companies need no longer look to hydro-development or to petroleum for their future power. It can be done.

Steam-power plant development has made notable advances. A pound of coal per kilowatt-hour is an obtainable performance in modern steam plants. H. A. Barre, executive engineer of the Southern California Edison Co., of Los Angeles, states that with oil fuel from 425 to 450 kw.-hr. per barrel is being obtained and that "at such efficiencies the fuel cost with oil at \$1 per barrel approximates 2½ mills per kilowatt-hour, a figure so low that additional stream-flow plants in California are practically out of the question, and plants having storage facilities must be scrutinized more carefully than hitherto. Only an increase of several hundred per cent in the price of fuel can change this condition."

An increase of 100 per cent in the price of fuel oil in California opens out possibilities for coal. Coal at \$8 per ton could compete with oil at \$2 per barrel. A future power market for coal does not appear to be far away. The situation appears to be a joint problem for the coal miners and the railroads.

Cambria Mine in Illinois an Exemplification of Economy, Safety and Order

Water-Tube Boilers, Steam-Jet Ash Removal, Chain Grates, Modern Furnace Settings Make Economical Power—Triprider Has Safe Seat as Well as Motorman—Stable and Motor-Barn Protection

By Frank H. Kneeland

Associate Editor, *Coal Age*, New York City

FROM THE ORDERLY appearance of a mine a good indication may often be afforded as to its economy and safety. For this appearance is a reflection of the ability and mental habits of the men who have planned and built it or of those who are now charged with its operation and upkeep.

One of the most noticeable characteristics of the No. 12 Mine of the Madison Coal Corporation located near Cambria in southern Illinois is neatness. Perhaps it would be more correct to say "neat orderliness," for at most industrial operations there is a limit to the degree of neatness that it pays to foster and maintain. Reasonable orderliness however is a fairly reliable indication of efficiency.

This mine is one of several operated by the Madison company. The headworks stand practically alone, no company-owned town being in their proximity. This is true of many of the mines throughout this region, but in such cases they are almost invariably located close beside an incorporated town or village where the mine force lives and from which the labor supply is drawn. In this instance, however, no such community is near at hand and the men who operate the mine must all travel a considerable distance to and from work.

It might, perhaps, be truthfully said that the operation of this mine depends upon the automobile, for without this means of conveyance the labor force obtainable would be small indeed. As is well known, southern Illinois is today a region of good roads, the better and more traveled thoroughfares being for the most part concrete-paved. Many of the men that work this mine live anywhere from one to fifteen or more miles distant.

In order to accommodate the large "flock" of automobiles that daily come to this operation the company has erected several large sheds each capable of holding about fifty cars. These buildings are double, that is, a machine can be driven in from either side. A partition extends through the center of the building reaching from the ground to the ridgepole. The stalls in these sheds are numbered and assigned one each to such employees as desire to avail themselves of this means of protecting their cars from the weather. A nominal charge of \$1 per stall per month is made. To prevent theft or tampering not only are the sheds located within a strongly fenced inclosure with lock-

able gate, but a watchman is employed to guard them.

This is one of the mines that generates its own power, the majority of plants in this field purchasing what energy is needed for their operation. The question will immediately arise in the minds of most people: How can an individual mine, using only a comparatively small quantity of current afford to generate energy when it can be readily purchased?

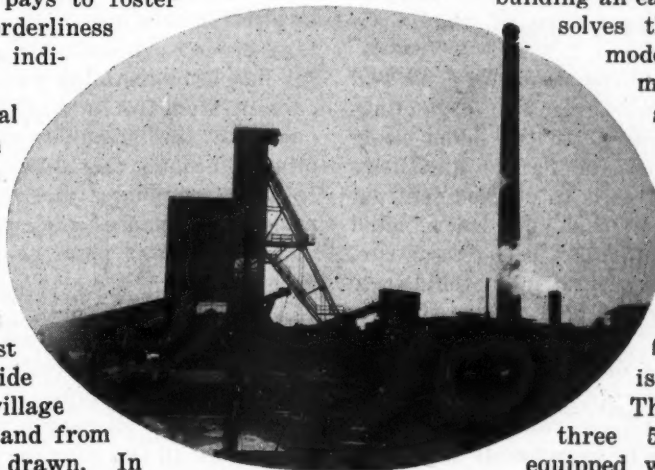
Economic generation of power at this mine is made possible for three reasons. First, an abundant water supply was obtained at a comparatively small cost by building an earth dam across a valley. This solves the water problem. Second, modern steam-generating equipment fitted with mechanical stokers, a steam-jet ash removal system and the like reduces the labor force to a practical minimum. And third, care was exercised in the purchase of the generators and their driving engines to the end that the fixed charge on this equipment is indeed low.

The boiler plant consists of three 500-hp. water-tube boilers equipped with chain-grate stokers and fired with $\frac{3}{4}$ -in. screenings. The McDonough coal-saving system has been installed. This automatically controls the draft, stoker speed, the water level in the boilers and regulates the flow to the feed-water heater. The peak demands on these boilers are sometimes 200 per cent of their normal ratings yet their steaming efficiency, because of this control, remains fairly uniform. About 770 tons of coal is burned monthly. As the

mine produces approximately 75,000 tons, about one ton of coal is consumed for each 100 tons of coal produced.

The furnace walls are lined with Plibrico and the outside of the boiler settings is covered with Duraflex. This prevents infiltration of air through the setting walls and thus aids materially in the proper and complete combustion not only of the coal but of the gases evolved during the coking process. Steam is not superheated, neither is it exhausted to a condenser.

The generating units, of which there are three, are all engine-driven. Only direct current is used at this mine, and this, as at most other mining plants, is produced at 275 volts. The two larger generators operate at 100 and 125 r.p.m. respectively and are direct-connected to Corliss engines. A smaller generator, normally used only as a standby and for emergency or



Cambria Mine Plant

In this tippie the head sheaves are housed, in and thus protected from the weather. The top of the feed-water heater may be seen to the right of the concrete stack in rear of the power plant. The shops building appears in the right foreground.

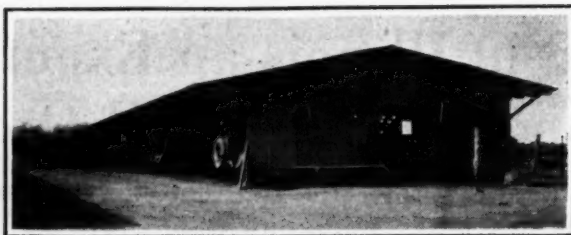
idle-day operation, is direct-connected to a high-speed engine fitted with an inertia governor. All of these machines were bought second-hand but in excellent condition at a price that was only a fraction of that of new equipment. They were originally purchased by industrial firms in the East for use in manufacturing. After serving the purpose for which they were originally installed and probably paying for them-

selves many times over, they were thrown on the market at the close of the war at truly bargain prices.

One piece of equipment at this plant deserves special mention—the feed-water heater. This though home-made is quite effective. It consists of an open-ended vertical tank into which the feed water is introduced near the top while the exhaust steam for heating enters near the bottom. Thus as the steam moves upward it comes into intimate contact with the water coming down in a finely divided state. By this means the water is heated practically to the temperature of the steam before being fed to the boilers.

The ash-disposal system is of the steam-jet type, and inasmuch as the stokers are chain grates no large clinkers are formed. The arrangement in the boiler room is such that one man can tend and handle the entire plant without undue effort. This is in marked contrast to some of the older plants in this field where hand firing still persists and where during a heavy day's run, in an installation of this size, several men would have to work incessantly in sweltering heat in an effort to keep up the steam pressure.

In this plant everything is orderly and neat. The draft and speed of the stokers are automatically controlled; adequate indicating and recording devices have been installed giving the lone fireman ample indication of load, steam flow, the composition of flue gases and



One of the Automobile Sheds

These sheds remind one strongly of those formerly erected near country churches to protect the conveyances used by the congregation. They are however double-sided (the old church shed was usually open on one side only) and each structure is capable of holding about fifty automobiles. Each employee who so desires is assigned a stall for which he pays a nominal monthly rental.

the like. And ordinarily little more than a gray haze may be seen issuing from the 9x200-ft. reinforced concrete stack, indicating practically perfect combustion. Modern science has supplanted old-time guesswork in coal combustion with the result that the labor expense for boiler-room operation is at present only \$7.25 per shift or \$21.75 per day.

A simple and reliable steam-driven hoist is employed at

this mine. Steam hoisting possesses certain obvious advantages, one of the chief of which is the fact that the sudden demand for power entailed is supplied by the hot water in the boilers. This gives up steam rapidly when the pressure is lowered slightly. So important is this consideration that many of the mines of southern Illinois that purchase power for most of the operations performed nevertheless use steam for hoisting, thus avoiding the swinging or fluctuating peak loads and heavy demands for electrical energy incident to electric hoisting.

In order to provide for emergency a motor-generator set has been installed within the power plant drawing current from the lines of the public utility serving this field. By this means, in case of a protracted strike or other shutdown this unit will furnish sufficient energy to keep the pumps and other equipment necessary to mine maintenance going without the expense of operating the power plant.

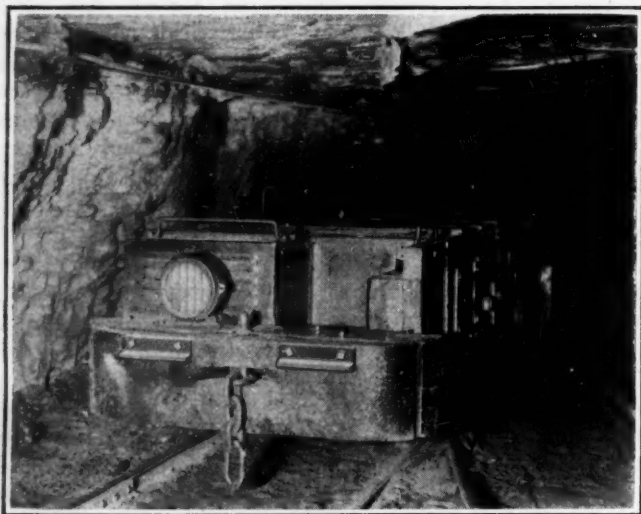
WHITEWASH AIDS LIGHT REFLECTION

Both trolley and storage-battery haulage is used below ground. The motor barns, underground shops, oil storage and mule stable (only two mules are employed) are all located near the shaft bottom. Here practically all the mine passages have been whitewashed to afford good light reflection. Gunitite also has been freely applied, where necessary, to prevent weathering. Rock dusting of the haulages and airways, which aids illumination, has also been extensively practiced throughout the workings.

Storage-battery locomotives in this mine are provided with charging racks of the Mancha type. Thus a machine with a nearly spent accumulator may be run into the barn, its battery placed on the rack and a fully charged battery substituted in a few minutes. Furthermore this change can be made by one man unaided. By this means these locomotives may be kept in almost constant operation.

Underground as well as on the surface, the transportation department is one of the most dangerous in which a man can work. Trip-riding appears to be one of the most perilous jobs in the mine. In order to render this kind of employment as safe as possible the Madison company has adopted the policy of providing ample cab space for the trip-rider on all main-line locomotives. A cab of this kind may be seen in one of the accompanying illustrations. It is located at the opposite end of the machine from the motorman's cab and is of sufficient size to accommodate the trip-rider easily.

This cab is provided with substantial handholds and is separated from the operating resistance by a perforated plate. This end of the locomotive also has a



Locomotive with Safety Seat for Trip rider

Every machine used as a main-haulage unit is provided with a trip-rider's cab such as may be seen on this locomotive. Here the trip-rider or brakeman has as much clear space as the locomotive driver has at the opposite end of the machine. There is consequently no excuse for his riding either on the bumper, the top of the locomotive or on any of the cars hauled. Inasmuch as trip-riding is unquestionably one of the most dangerous jobs in the entire mine, provision of a safe place wherein the man performing this necessary work can ride, constitutes a safety measure of no mean importance.

piece of angle iron bolted to either side of the bumper to prevent cars from climbing over or telescoping the machine in case of a wreck or derailment. The particular locomotive shown in the illustration is a hybrid, being built up of the chassis of one manufacturer, the motors and gearing of another, and the control equipment and trolley of yet a third. It thus possesses the good qualities inherent to the product of all three builders.

CRUSHED ROCK ABSORBS OIL

The underground locomotive barn is of ample size and well-lighted. The floor is covered with crushed rock which is carefully graded to a level surface. Any oil or other liquid that may leak out or be spilled upon it is promptly absorbed and thus rendered practically harmless so far as fire hazard is concerned. When a portion of this rock becomes discolored it is raked over bringing fresh rock to the top. When an appreciable percentage of this material shows the presence of oil the entire quantity is loaded out and new rock put down. This preserves continuously the neat business-like appearance of this barn.

The mule stable is kept up quite as carefully as the motor barn. Entrance to the stable is gained through a "wicket" door. This is constructed of 1½-in. steel pipe welded together forming a unit that will neither sag, bend nor warp out of shape. The mangers and feed boxes are of concrete and thus entirely sanitary. Orts removed from the mangers as well as the other bedding are cleaned out periodically, usually every day. The stalls are commodious and in addition the animals have the run of a big box stall or play room.

One of the interesting details of this stable is the sprinkler system by means of which this portion of the mine is protected from fire. Thus the opening of a single valve will thoroughly drench the whole interior of the stable—top, sides and floor. The piping and sprays by which this result is accomplished is similar to the sprinkler system installed in many an office building or store.

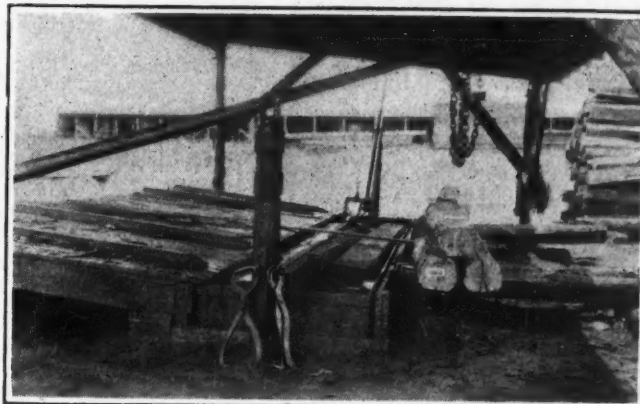
But the best of motive power is useless unless suitable track is provided. An indication of the care that is being expended upon this detail of operation is furnished by the fact that all ties entering this mine, except possibly a few employed in work of a temporary character, are being treated with preservative before use. Permanent timbering is being preserved in the same way.

PRESERVE ALL "PERMANENT" TIMBER

For this purpose the company has built and maintains a creosoting plant of its own. This is shown in one of the accompanying illustrations. It consists of a shed housing a creosote tank, with means for lifting ties and timbers into and out of it, together with a suitable drain board. In use the ties or other timbers, after being properly seasoned, are immersed in this tank for from 15 to 30 min., depending upon their size. They are then lifted out and placed on the adjacent sloping board where they are allowed to drain for a length of time approximately equivalent to their time of soaking, after which they are removed and piled ready for use.

As will be observed in the illustration, a pipe standard has been erected at each end of the tank. At its upper end each of these standards carries a lever, also made of pipe and hung by means of a universal joint.

To the short arm of this lever a chain carrying a pair of wood tongs is attached. By this simple means even quite heavy pieces of timber may be handled easily by one man or at the most two. Treating mine timbers in this way naturally involves some expense but it



All Permanent Timber Work Is Creosoted

Preservative treatment at this mine is applied to all ties used in building permanent track and to all other timbers used underground where a life greater than that of an untreated timber is desired. The immersion process is employed. The ties or timbers are soaked for from 15 to 30 min., after which they are allowed to drain before being stored ready for use. This plant is so arranged that the labor cost involved is comparatively small.

prolongs their life to such an extent as to render the practice highly profitable.

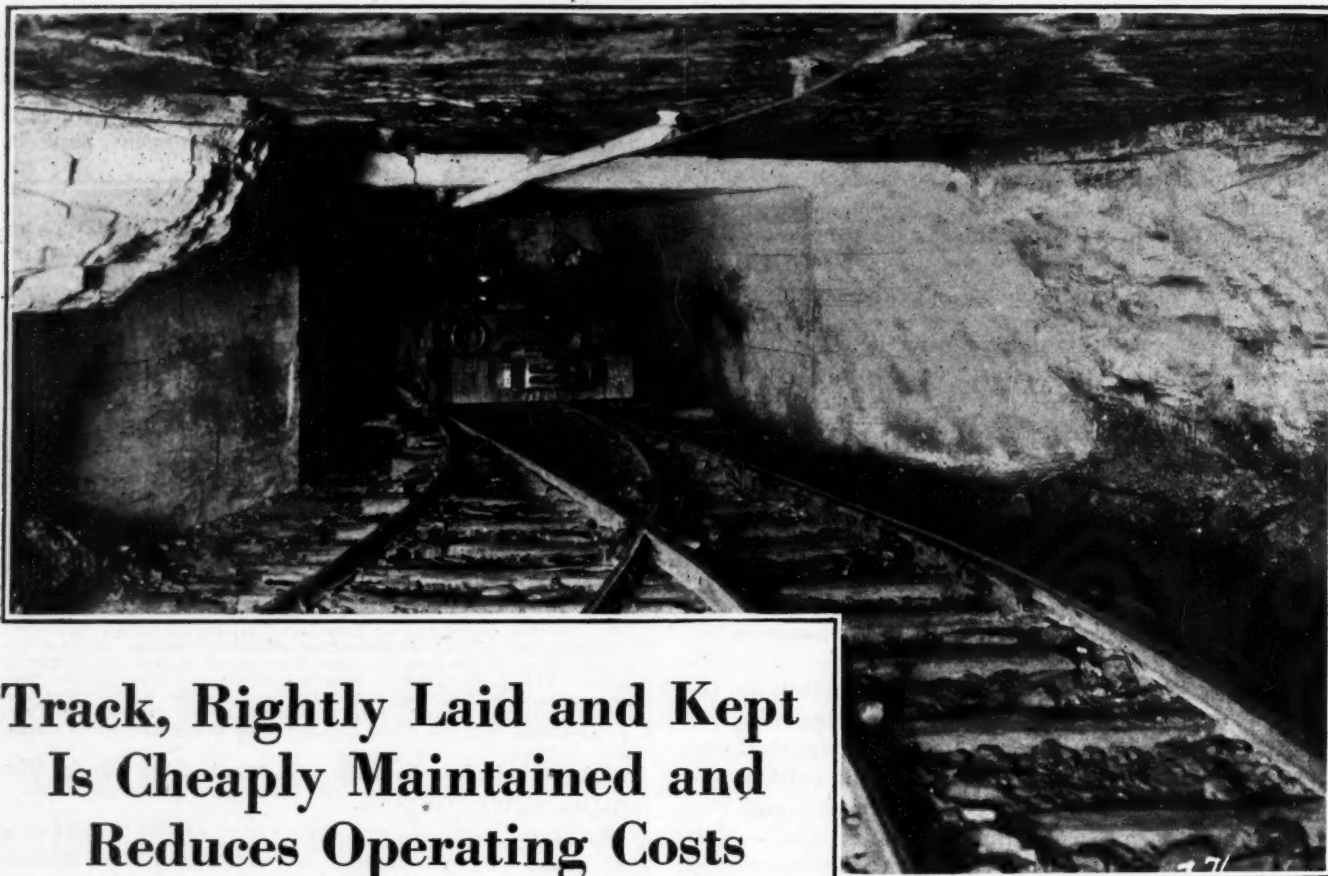
Machines, factories and mines are capable of yielding their best only when they are maintained in proper condition with each component part "in tune" with the others. Although some plants may be able to produce large low-cost tonnages even though apparent disorder reigns, they are the exception rather than the rule. The experienced mining man, therefore, almost instinctively expects efficient coal production—and nothing else—from a mine that is habitually kept as "shipshape" as Madison No. 12.

Gas Coals Should Be Low in Sulphur

About one-quarter or one-third of the sulphur in gas coals appears in the gas as hydrogen sulphide, according to H. J. Rose, in an address before the American Institute of Mining and Metallurgical Engineers. This hydrogen sulphide must be completely removed before the gas is sold for city use. Organic sulphur compounds such as carbon bisulphide also occur in the gas and are not removed by any purification process commercially used in this country. This limits the permissible sulphur content of gas coals, for city regulations commonly specify that the total sulphur content of the gas shall not exceed 30 grains per 100 cu.ft. Such a specification is sufficiently liberal in most localities and seldom interferes with the use of a coal which is considered satisfactory from the standpoint of hydrogen sulphide in gas and sulphur in coke.

Most large gas companies require that gas coals for their use shall contain less than 1.25 per cent sulphur, and a large quantity of the gas coal used in this country has a sulphur content well under one per cent.

Gas coals are characterized by their high yield of heat units in the gas made from them per pound of coal. They have a volatile content ranging from about 33 to 38 per cent, dry basis. When carbonized in byproduct ovens, they may be used alone or with an admixture of low-volatile coal to improve the quality of the coke resulting from their carbonization.



Track, Rightly Laid and Kept Is Cheaply Maintained and Reduces Operating Costs

Proper Appropriation Should Be Provided and Tracks Should Be Constructed and Maintained by Gang Under Competent Road Foreman—Repairs Should Not Await Developments—Good Work as Necessary as First-Class Material

By Fred C. Hohn

Consulting Engineer, Scranton, Pa.

TOO little consideration has been given to the necessity for good mine tracks and to the means by which alone such tracks can be attained. Mine tracks will give satisfactory service only if the track is properly aligned, rightly constructed and thereafter carefully maintained.

Where good tracks are provided, delays are largely avoided, the miner is regularly supplied with the needed cars and the flow of coal from the working places to the breaker is regular and dependable thus providing the best use of the rolling stock.

Trip movements can then be speeded, for fear of derailments is greatly minimized. The faster the movement of the cars the larger the number of car-miles per start for any given number of units of equipment whether of cars or locomotives. The more infrequent the derailments the less the number of wrecks and the lower the expense for mine-car and locomotive maintenance. All these factors, influenced favorably or unfavorably by good and bad tracks respectively, lower or raise the operating costs, as the case may be. Too often these considerations are overlooked.

Good track only can be obtained by organizing track labor under competent supervision and by the use of materials of such quality and design as will be suited to the weight of the rolling equipment and the intensity of the traffic. By the use of skilled trackmen under

direct supervision more and better work will be done.

These are simple, fundamental principles of management applied to track work, but when applied they will reduce construction and maintenance costs. To achieve these results planning in advance is needed. The organization and work should be based on the expected number of loads, their origin, the intensity of traffic, the grades, the expected life of the producing section and the track facilities needed. They cannot and should not be attempted without a consideration of these vital matters.

Having this information at hand the appropriations required to construct new tracks when they are needed and to provide an adequate sum for the maintenance of the tracks already in use can be estimated, and the appropriations can be distributed as to time so as to bring an even burden on the costs of production.

In laying out the haulage system, storage facilities must be considered and provided, especially at the foot and top of the shaft and in the tippie yards. These are necessary to absorb the delays that occur at these points. With such facilities a delay at one point will not result in a paralysis of operation throughout the entire mine resulting in a heavy loss in production.

In mine haulage, consideration is given only too rarely to grades, but they are of utmost importance if the maximum tonnage is to be hauled with the equipment and power provided. This is especially necessary where storage-battery locomotives operate. Short and heavy gradients that could readily be converted into longer

Abstract of article entitled "Track Work, Details and Maintenance" delivered at the meeting of operating men in connection with the Exposition held by the American Mining Congress at Cincinnati, Ohio.

but lighter grades often consume more power than the rest of the haulage.

As roads get longer, transportation delays are likely to become more frequent, and the production per man will then be unavoidably lowered unless the tracks are such that haulage is speedy and regular.

Many companies, by purchasing cars and locomotives of the latest types, are striving for a higher production per man and lower haulage costs, yet they give their tracks little or no thought. As poor tracks are the cause of frequent derailments and wrecks, much of the efficiency that such new and modern equipment would furnish is not attained. It is difficult, however, to convince any one that this is true, so convinced are they that wrecks are necessarily concomitant with car movement.

I have found roads in the mines that cost as much to maintain as the best railroad track. This sounds ridiculous when the relative weights and speeds of the two kinds of traffic are compared. The

reason is that railroad tracks are scientifically developed and maintained so as to obtain maximum service from the materials used and from the labor expended, whereas mine tracks seem to be considered only makeshifts to be constructed of a cheap class of material such as is wholly unsuited to the purpose for which it is to be used.

This material is improperly installed, has the advantage of little or no maintenance with the result that its service and life are cut short, and labor is wasted in continual and desultory patching.

Nevertheless a sense of the importance of good tracks has been growing for a long time, even though the development itself has been slow, owing to the impression, probably, that the cost is prohibitive or to the fact that too many are ignorant of what constitutes good track.

As a matter of fact, scientifically constructed and maintained tracks cost about 50 per cent less than poor tracks, to say nothing of the saving in operating costs and the increased production per man that such roadways afford. The mistake should not be made of believing that good track can be developed by the use of high-class materials alone. Material, no matter how well designed or of what quality, will not give maximum service unless it is properly installed and maintained.

Mine track work is usually left to the section foreman who does it without any specified program or standards. He is usually entirely

unskilled in this class of work, and his time is occupied with production and mining problems, so he usually leaves track repairs to a tracklayer who spends his entire time cobbling and patching up breaks in the road, that have already caused delays. At the end of the day's work no real reconditioning has been accomplished, and as a result the tracks are in no better operating condition on the following day than they were when the work was commenced; whereas if the work is properly done, the causes of derailments are anticipated and removed and the delays are avoided.

For this reason it will be found beneficial to have a definite construction and maintenance plan to carry it out under certain well-studied and specific standards as

to workmanship and materials, these to be determined by the local conditions of the particular mine. It will be found that trained trackmen, who know the standards, will be the best aid in carrying out this program.

Only by careful construction can good roads

be obtained. The class of traffic and the expected life of the road must be determined before a decision is made as to the character of construction. In mines as certainly as on railroads, tracks should have adequate drainage. Curvature and grades should be, in both cases, strictly limited.

BED TIES ON UNIFORM SURFACE

Where the ties are set up loosely on blocks and where mine refuse is used for ballasting (covered with boiler ashes perhaps to provide easy walking) the tracks will offer little support to the load they must carry and will not stay in place.

To obtain a properly ballasted track, the ties should be bedded on a uniform surface with material suitable for that purpose in accordance with a standard ballast section. The track should be provided with a sufficient

shoulder of ballast to keep it in alignment. Crushed stone and hard-coal boiler ashes make excellent ballasting materials. I have found the plans shown in the drawings on p. 179 to be entirely suitable for this purpose, each under its respective condition.

For new tracks a roadbed to line should be prepared, with ties uniformly placed and of a size specified for the class of track under construction. Rails heavier than 25 lb. per yard should be laid with suspended joints, fully plated, bolted, spiked, ballasted and surfaced to a uniform grade. To avoid a center-bound

Table I—Mine-Track Construction Data

Building one mile of new track complete including ballast.....	3,000 man-hours
Turnouts, Nos. 2 and 3.....	16 hr.
No. 4.....	32 hr.
No. 6.....	40 hr.
Distributing materials.....	300 hr. per track mile
Cleaning tracks	300 hr. per track mile

Table II—Mine-Track Maintenance Data

Aligning and surfacing	720 hr. per mile of track per year
Repairing switches	40 hr. each per year
Renewing cross-ties	3 hr. each per year
Renewing switch ties	40 hr. per 1,000 b.m.
Relaying rails	1,200 hr. per mile of track
Spacing ties and surfacing new rail	1,000 hr. per mile of track
Reballasting, if needed	2,000 hr. per mile of track
Cleaning ditches	300 hr. per mile of track
Distributing materials	100 hr. per mile of track
Taking up track	300 hr. per mile of track
Renewing turnouts Nos. 2 and 3	16 hr. each
No. 4	32 hr. each
No. 6	40 hr. each

For normal upkeep the maintenance forces can be estimated by the following equivalent man-hours per mile of track:

Main haulage roads	1.5 miles per man per 8-hr. day
Secondary haulage roads equal	1.25 miles of main-haulage roads
Ten switches on main-haulage roads equal	1 mile of track
Twenty-five switches on counter-haulage roads equal	1 mile of track

track the material under the center of the tie should not be tamped.

For speeds customary in mines the outer rails on curves need not be elevated, and they should never be raised more than $\frac{1}{2}$ in. above the inside rail lest the level across the heading be changed enough to cause the water running down the grade on one side of the heading to be deflected to the other.

No allowance need be made for the expansion of the rail. All joints can be made tight. All ties should be full spiked, the spikes being driven vertically and tight down on the rail. The spikes should be spread apart as far as the ties will permit, keeping the inside spikes opposite so as to hold the ties firmly in position. In double track the outside spikes should be spaced ahead of the inside spikes in the direction of traffic.

All joints should be fully bolted, care being taken not to stretch the bolts beyond their elastic limit. They should be retightened and set up after the track has been in service a week or ten days or oftener if conditions require it.

It is important to gage the rails so as to prevent the spreading of the track. The practice of pulling a rail into position with a gage having a hook on one end and a ring on the other, should never be allowed. If the track is not to gage, the spikes should be pulled, and the ties adzed down to provide a new bearing for the rail. If track cannot be kept to gage, tie plates should be applied to give the rail additional bearing surface on the tie.

Turnouts, no matter how well constructed, will offer some impediment to car movement, and a large percentage of the transportation delays can be attributed to derailments resulting from the poorly designed ill-constructed and inefficiently maintained turnouts customary at many mines. Well-designed switches, frogs and turnouts not only assist in the efficient movement of cars but lower the wear and tear of the rolling equipment.

Turnouts, of suitable materials and designed to meet transportation requirements efficiently, have been developed by the subcommittee on the Standardization of Inside Tracks. Five years ago I designed approximately 5,000 turnouts with switches. These included cast-steel flange-bearing frogs. This equipment is still in service, and a recent inspection showed that it has as many more years of life ahead.

LIGHT TIES WASTEFUL

Because of the scarcity of timber the mine-tie problem is becoming more serious each year. Mine ties are now being manufactured from all kinds of wood. As a result some are so small that they are nothing more than poles with two sides slightly flattened. They have a serviceable life of from one to one and a half years. This class of tie though cheap in price is expensive when cost of installation and service rendered is considered. When all the factors of cost are taken into the calculation such ties are more expensive than a No. 1 standard railroad tie.

An economical tie is one made out of white burr or rock oak, chestnut, black or honey locust, pitch pine or timber of equal quality. Such a tie will have a life of six years. Treated ties are economical and suitable for mine use. Ties should measure 6x7 in. when surfaced on four sides or 6 in. thick with 5-in. face, top and bottom, when surfaced only on two sides. They should be long enough to extend 15 in. beyond the gage line.

The seasoning and barking of mine ties are not given any consideration in mine work; both are necessary if the full value of the tie is to be realized. Steel ties have their place in mine service, but they are not adapted to general use.

LIFT USELESS TRACK

As soon as tracks have no further use, the material should be lifted starting at one end and removing the track completely. The reclaimed accessories should be classified and stored at points of convenience for future use or distribution or should be sent to the surface for other disposition. As the cost of ties, rail and other track materials is a considerable item of the total mine cost it is easy to see that by the complete recovery of such material much money is saved.

When material is needed for new work it should be delivered on the job in the quantities required. These quantities should be accurately ascertained, and neither

more nor less should be delivered. Maintenance material should be kept at specified points convenient to the workmen, and the requirements should be anticipated as far as possible, the stock being replenished at regular intervals.

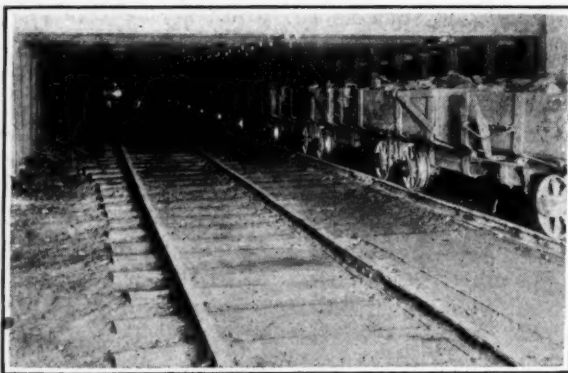
These supplies should be neatly piled, and all small material should be stored in the tool house or left in its original containers. An estimate of the quantity of material required can be obtained from the plans for future expansion, and the purchases of material should be made in accordance with those needs.

Labor and material can be properly organized for the construction and maintenance of track if a map is made showing existing roads, their character, the haulage equipment that will be used on them, the number of cars and the tonnage per start that will be hauled on them year by year. A mining forecast can be made by years in cars per start for at least five years in advance or even to the exhaustion of the property. With this information the work to be done is readily determined, and from that data the materials and labor requirements can be calculated and scheduled.

NEED NEW MINE-RAIL SECTION

For the different classes of work the estimates in Tables I and II will be found sufficient, if the work is properly supervised to maintain and construct mine track in good operating condition and to do it economically.

Light-section rails are not well designed for mine use. Mine rails fail from the corrosion of the base and



Track Is Already a Major Problem

The coal industry for many years tried to get along with light, badly laid and badly graded tracks, but it is now getting to see that track-work must be methodically laid, inspected and repaired, if only for its own sake, altogether apart from advantages in economy, speed and safety in haulage. A badly laid track soon goes to pieces under traffic and corrosion.

from abuse, whereas all light-section rails are of the American Society of Civil Engineers' section which is designed for wear on the ball and for stiffness. In the heavier rails the American Railway Association, Type B, section is ideal, having a thick heavy flange that will not corrode away rapidly. A new section suitable for mine work should be designed. It should have the stiffness, the height for fishplates and the flange width of the A.S.C.E. section with an added thickness in the flange to give life against corrosion.

Rails for mine use should be manufactured with prescribed limits of chemical composition and finished with smooth heads, straight in line and surface, without twists, waves or kinks. They should be sawed square at the ends, and all burrs should be carefully removed. They should be drilled with circular holes varying not over $\frac{1}{2}$ in. from the specified diameter. The rails should not vary over $\frac{3}{8}$ in. from the specified lengths.

Joints cannot be passed by lightly, for they bridge the weak part of the rail, the efficiency of which is no more than that of the joint. Angle-bar joints should be used wherever possible. They should be smoothly rolled to conform to specified dimensions and fit the rails. Too often rail joints are not kept tight. It is impossible to keep a tight joint without suitable bolts. Bolts with a Harvey grip thread and recess nuts fitted, tight enough not to allow over three full turns by hand, will give tightness with minimum maintenance cost.

PUNCH BOND HOLES AT MINE

Rails should not be punched at the mills for terminal bonds. The surface of the hole rusts, and it is, moreover, irregular, so that in any event before the bonds can be applied, the holes must be reamed out. It costs no more to drill the holes on the ground and thus insure a good contact.

The track spike, although not given much attention has its functions to perform. It also should be well-manufactured and provided with a sharp chisel point so that when driven in the tie it will cut the fiber of the wood, thus giving it a firm grip.

For 25-lb. rail and lighter with 4-in. ties, $\frac{1}{2}$ x3-in. spikes are most suitable; for 25- to 35-lb. rails and 5-in. ties a $\frac{1}{2}$ x4-in. spike is desirable; and for heavier rails with 6-in. ties the $\frac{1}{2}$ x4-in. spike is to be recommended.

These briefly are the fundamental principles on which track may be constructed and maintained in as efficient and economical condition as the better classes of rolling stock now coming into common use. Track thus made and kept will insure the free and uninterrupted movement of the cars at the lowest possible cost.

Carbon Dioxide Injurious Even With Oxygen Normal

Men can breathe air containing many times the quantity of carbon dioxide found in the worst ventilated theaters or assembly halls, which, according to Rosenau, do not contain over 0.5 per cent of carbon dioxide. Nevertheless, in mines it sometimes occurs in sufficient quantities to cause symptoms in men and even unconsciousness and death.

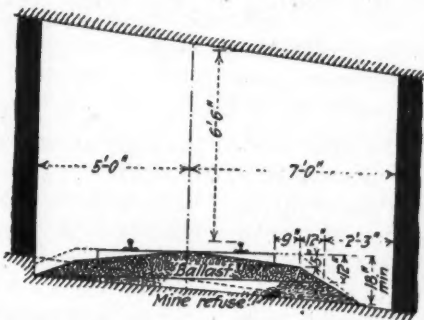
One-half of one per cent of carbon dioxide in normal air causes a slight but unnoticeable increase in the ventilation of the lungs, that is, a man exposed to one-half of one per cent of carbon dioxide will breathe a little deeper and a little faster than when in pure air. If 2 per cent of carbon dioxide is present in the air, the ventilation of the lungs will be increased about 50 per cent; if there is 3 per cent the lung ventilation will be increased 100 per cent; 5 per cent causes about a 300 per cent increase in the ventilation of the lungs

and the breathing is laborious; 10 per cent cannot be endured for more than a few minutes.

These are the results obtained from carbon-dioxide air when the oxygen in the air progressively becomes converted into carbon dioxide and the subject is not working. According to Sollmann, if oxygen is supplied so as to maintain a percentage of 20, no effects are noticeable until the concentration reaches 3 per cent of carbon dioxide by volume. With this concentration, there is excessive breathing (hypernea) and discomfort; $8\frac{1}{2}$ per cent produced distinctly labored breathing (dyspnea) in man in a few minutes, with rise of blood pressure and congestion, which became insupportable in 20 min. but disappeared promptly in fresh air. The symptoms increased to 15 per cent, but even 20 per cent is not dangerous in an hour to animals, and probably not to man.

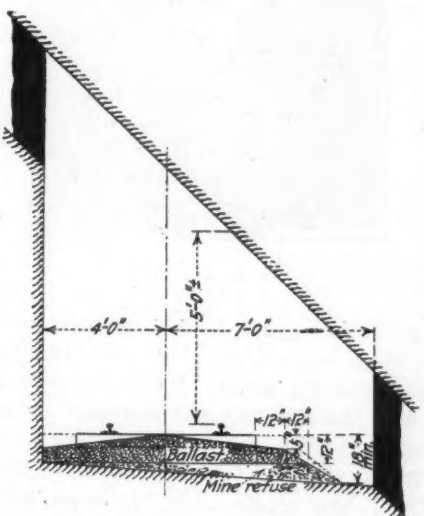
With 25 to 30 per cent the stimulant phenomena pass into depression, with diminished respiration, fall of blood pressure, insensibility (coma) generally without convulsions, loss of reflexes, lack of feeling (anesthesia) and gradually death after some hours, the heart reaction outlasting respiration. With higher concentrations, the period of stimulation is still briefer. With pure carbon dioxide, death may occur in a few minutes as the mixed effect of carbon dioxide and lack of oxygen in the blood (anoxemia). Much discomfort that has been ascribed to carbon dioxide has been due to high temperature and moisture.

Abstract from an article entitled "Permissible Limits of Toxic and Noxious Gases in Mine and Tunnel Ventilation" delivered by R. R. Sayers, Chief Surgeon, U. S. Bureau of Mines, U. S. Public Health Service, Washington D. C., at a meeting of the American Institute of Mining and Metallurgical Engineers.



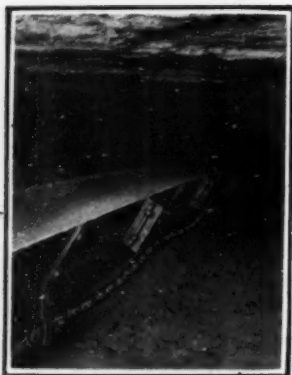
Standard Track and Ballast Section for Main and Secondary Haulage

The track is set on ballast and does not rest on the floor of the mine. In fact the latter has been excavated a little so as to reduce the slope from side to side, leaving enough, however, for good drainage.



Standard Roadbed and Ballast Section for Pitching Beds

The bottom is given an easy pitch of about 6 in. so as to carry the water to one side. The shoulder of the ballast extends 12 in. beyond the end of the ties. The track lies well on the high side of the roadway. It thus has both good clearance and drainage and is not easily pushed sidewise.



Room-and-Pillar Mining With Conveyors Cuts All Production Costs

**Lowers Materially Cost of Coal on Cars
at Room Entry, Also Total Mine Labor—
Results of Loading 55,000 Tons Recorded**

By R. A. Suppes

General Superintendent, Knickerbocker Smokeless Coal Co.,
Johnstown, Pa.



WITH THE CONVICTION that the room-and-pillar system is not likely to be discarded, I have for the past fifteen months been fitting that system to modern methods of operation at two of the mines of the Knickerbocker Smokeless Coal Co. These conveyors are working in one mine in coal 42 in. thick and in another in a bed varying in thickness from 23 to 44 in.

The biggest problem in mining is that of transportation. The loading problem is a subordinate issue. At the Knickerbocker properties I have devoted in that direction most of the efforts I have made towards mechanization. The problem, as I visualized it, was not to find a new system of mining, nor to design a new piece of equipment and adapt a new mining layout to its needs but to adapt mechanization to a mining plan which has been tried and found satisfactory in Pennsylvania in many years of operation. I have experimented to some extent with longwall at the mines of the company.

It is my conviction that mechanical loading must be made to fit in with room-and-pillar workings, because only with them will it be possible to cope, separately or collectively, as the case may be, with all the adverse conditions presented by the roof, bottom and coal seam.

During the life of a mine, many different conditions such as good and bad roof, hard and soft bottom, rolls in the floor, horsebacks, clay veins, local dips and raises, water, high and low coal may be met. Only the room-and-pillar can be worked successfully under all these conditions.

Any mechanical systems of loading or conveying that will be suitable to the mines as they are now projected will be successful and acceptable. With other methods than room-and-pillar, the roof can be controlled but not with the same economic outcome. The equipment used at the Knickerbocker mines consists of one main drag conveyor from 250 to 300 ft. long, driven by a 15-hp. motor; two 12-ft. face conveyors, driven by 4-hp. motors; one mining machine, one 1½-hp. auxiliary fan; a 5-hp. hoist; one face floodlight and one blasting battery.

The rooms are widened at a 32-deg. angle. When the rooms have been driven 40 ft. from the entry a face conveyor is introduced. After they have reached a

distance of 50 ft. from the entry a second conveyor is provided. These conveyors overlap, of course, and are adjustable to the width of the face. It is advisable to place the face conveyors as close to the work as possible. When the room face is 60 ft. from the entry, the first crosscut is started.

Five men do all the work at each place. Two cut the face; one operates the mining machine and one scrapes bugdust and sets a row of temporary props 18 in. from the coal face. Two other men after loading out the coal follow the undercutting by drilling the necessary shotholes. One of the facemen then signals the operative on the heading to send in material for extending the main conveyor which includes a section of conveyor pan, a 12-ft. length of chain, cap pieces and props.

When the material reaches the tail end of the conveyor, the latter is stopped by one of the facemen.

Another faceman and the operative from the heading together add a section to the main conveyor. This requires from 7 to 10 min.

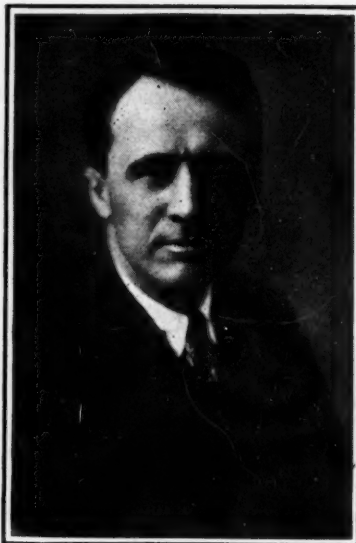
The other three facemen, having completed the cutting and drilling move the face conveyors to within 3 ft. of the face and set a permanent row of props back of them. The district mine inspector does not permit the props to be at any time more than 8 ft. from the face and all permanent propping must be set not more than 6 ft. apart.

The holes, which are drilled prior to moving up the conveyors, are set about 7 ft. apart so there are six holes in each 35-ft. face. The corner holes are placed about 14 in. from the ribs. Each hole is charged with 1½ sticks of permissible powder, the cartridges being of 1½-in. diameter. Delay det-

onators are used, and the holes are tamped with rock. One man is delegated to shoot the holes which he does from a location on the heading.

After the coal is shot, the smoke is swept from the face by an auxiliary fan with 12-in. flexible tubing. The face is cleared in about 5 min. Four men then go to the face and spend about 25 min. cleaning and gobbing the fallen top slate, 4 in. of which comes down with the coal.

While coal is down and has not been loaded, the loads are removed and a trip of empty mine cars is placed by the locomotive above the point where the main conveyor discharges. In loading a face cut, if the mining machine goes from right to left, the coal in the right hand corner of the room is loaded out first. This per-



R. A. Suppes

Article, entitled "Room-and-Pillar Mining with Conveyors," delivered at the Convention of Mine-Operating Officials held by the American Mining Congress at Cincinnati, Ohio.

mits the cutter to sump and start undercutting before the rest of the cut is loaded out. When the face is about two-thirds undercut, one of the men starts to load machine cuttings and set temporary props. Two other men complete the remaining work and drill the necessary shotholes.

These cycles continue until the room face is 130 ft. from the heading when a second crosscut is started. The first cut in a crosscut is loaded directly into the main conveyor. A face conveyor is used for the loading of the second cut. In 15 min. the conveyor can be moved back to the room face from its position in the crosscut.

HOLINGS IN PILLAR 20 FT. WIDE

Each room is driven 250 ft. long, and on the last cut the mining machine is swung around and takes the first cut, 25 ft. wide, out of the rib. This pillar is cut through in three cuts. These are loaded with the last cut made at the face of the room. The rest of the pillar is worked in the manner described: 1 and 2 are loaded out with 1A; 3 and 3A are loaded out together; 4 and 4A also together and 5 and 5A likewise and so on.

If the roof is bad at a point such as 11 and 11A, these areas are undercut and loaded leaving, however, as is shown in Fig. 2, a stump X 5 ft. square. This stump is removed by pickwork after the main conveyor has been shortened four pan lengths at its tail end so as to be at A. In some cases it may be necessary to leave the stump still standing. The crosscuts in the pillar are timbered in the same manner as the face. A double break row of props is set at each location of the tail end of the conveyor.

The headings are driven on the double-entry system with each heading 28 ft. wide. The distance between centers is 80 ft. A mine-car track is laid through the last crosscut of the entry and connected with the track in the parallel heading giving ample room for a supply of mine cars.

The heading face is advanced 250 ft. at a time and the chain pillar is then cut through 25 ft. from the face, half of the breakthrough being driven from each side. No room necks are driven till this crosscut has been completed, but as soon as it holes through three of the men are transferred to the work of necking the rooms. The two other men break up the conveyor, load and move its parts to the loading point on the heading together with any surplus timber and tubing.

The last 25 ft. beyond the inby crosscut is sometimes driven narrow. This extension gives space beyond the last crosscut for setting up the head end of the conveyor when the time comes to advance the headings. The main and back headings are driven alternately. As soon as one heading is advanced the equipment is moved to the parallel entry, two men being paid by yardage to brush and lay track in the first heading. No heading stumps, chain or barrier pillars have been drawn with conveyors as

a means of transportation, but a plan has been prepared for doing this, and as soon as one unit now engaged in room work has completed its section it will be set to work on the removal of heading stumps and pillars.

Upon finishing a face two of the five men employed go to the location where the next face is to be driven and shoot a pot out of the roof of the heading to provide room for the loading boom of the conveyor. This headroom is required wherever the normal height of the heading is less than 5½ ft. The rock from this pot shot will fill from three to five cars, usually the smaller number.

Three of the crew stay at the first conveyor location and break the conveyor into small parts for easy handling, the loading boom, or elevating conveyor being first disconnected. The boom weighs 885 lb. and is loaded onto a truck, controllers and control panel following. The motor end of the head section which weighs 975 lb. is next loaded, then the pan end of the head section which weighs 512 lb.

Next comes the tail section of 363 lb. and the intermediate pans weighing 80 lb. each, 12-ft. lengths of chain weighing 195 lb. each and the two face conveyors weighing 510 lb. each complete with motor. The mining machine trailer and mining machine are pulled to the heading. The material thus loaded is hauled to the new location by a locomotive.

The mining machine is first placed in position. Then the motor end and head frame of the conveyor are set on sights. The cable reel, trailer, loading boom, tail frame and an intermediate section follow. The mine electrician is responsible for setting up the electrical

control apparatus and for making the electrical connections. He is also responsible at all times for the proper lubrication of the equipment. While the auxiliary fan which weighs 87 lb. and the first 25 ft. section of air tubing are being set up with the face control wire reel, floodlight and battery-wire reel, the mine electrician tests the operation of the mining machine and the main conveyor. The 5-hp. hoist which weighs 1,412 lb. is next moved. This unit is usually moved for every third face and is set at the mouth of the neck of the room next to that which is being worked. The resistance and control for this unit are set alongside the conveyor and away from the hoist so that the operative stationed at that point can run both the hoist and the conveyor unit conveniently.

The following is a summary of the performances of the four face conveyors that have been operating at the Knickerbocker mines on the room-and-pillar system. Unit 1-T worked the first fourteen faces in 8,560 man-hours, loading 17,371 tons of coal, 1,240 tons per face and 16.23 tons of coal per man per 8-hr. shift. In addition each man handled 2.3 tons of slate per shift. The work thus figured includes not only the loading of the coal but all the moving, undercutting, drilling, charging of shotholes, shooting, handling of top slate which

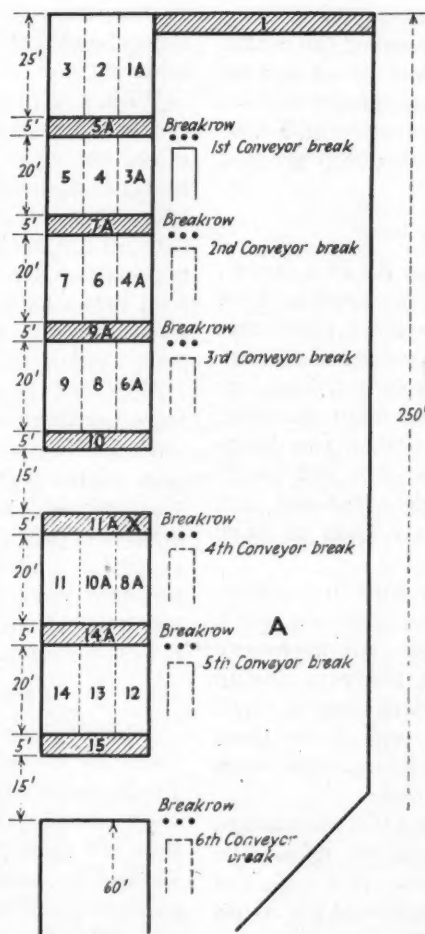


Fig. 1—Method of Pillar Drawing

Pillars 1 and 2 are loaded out with 1A; 3 and 3A together; 4 and 4A together; 5 and 5A together, and so on. The various positions of the conveyors are shown.

falls with the coal, timbering, advancing or retreating of the main conveyor, face conveyors, air tubing, flood-light control and battery wire and handing of all supplies from mine car to face including props, cap pieces, air tubing, explosives and parts of the conveyor itself.

The fourteen faces mentioned were all new places. The men working on the first four were paid on an hourly basis, but since then all work without exception has been paid for on a piece-work basis. The first four faces were driven as an experiment and they developed the fact that the roof conditions would allow a 35-ft. room to be driven with an 18-ft. pillar, and these dimensions have been followed in planning all new work.

The next six faces were extensions of old rooms which had been driven from 30 to 110 ft. by old methods. These rooms required retimbering. They dipped toward the face and had been turned off at 40-ft. centers. The rooms were continued on the new system, but it was necessary to drive them only 25 ft. wide with a 15-ft. pillar. The first room and pillar worked well, the next room was driven to its destination, and the pillar had been two-thirds extracted when the roof, being weakened by a slip that extended across three rooms, caved suddenly almost without warning.

The mining machine escaped being covered by the fall but was cut off with 40 ft. of main conveyor and two face conveyors. The cost of the repair to this equipment is included in the costs which will be discussed later. The recovery of the equipment and its repair was effected at the expenditure of 518 man-hours. The method by which the pillars were drawn prevented complete destruction of the equipment.

STOP MACHINERY TO NOTE ROOF

The mining machine was removed on its own power, and the only injury it sustained was the bending of a clutch handle. One face conveyor required some new parts and ultimately had to be torn down, straightened and rebuilt. Another had to be provided with a new motor and drive. The tail end of the main conveyor had to be straightened and provided with a new bearing. Furthermore, 36 ft. of conveyor pan and 18 ft. of chain had to be abandoned. As this material cost only \$75 when new it would not have paid to have attempted its reclamation.

Experience has shown that on pillar work it is advisable to stop all machinery at definite intervals for 3 min. to listen for signs of working roof. All machinery including the drive end of the main conveyor should operate quietly. Experience also showed that a 15-ft. pillar was insufficient. However, the rest of the faces in the six-room section were driven 25 ft. wide with 15-ft. pillars without any further trouble.

The men loaded 6,000 tons of coal in 3,992 man-hours, 1,001 tons per face or 12.04 tons of coal per man-shift. Each man handled on an average per shift 2.3 tons of top slate. Under the conditions this series of six rooms did not maintain the output per man-shift that was obtained in the fourteen room series that preceded it.

In all twenty places, Unit 1-T averaged 14.7 tons of coal loaded and 2.3 tons of top slate handled per man

shift. The cost for labor per ton was reduced 41.7 per cent and the earnings were 19.6 per cent more net than when the men operated under the previous conditions.

Unfortunately, the number of hours of delay were not kept on the first fourteen faces but on the six faces that followed 720 man-hours delay were caused by main- and face-conveyor and mining-machine trouble, waiting to shift mine cars, cars or locomotive off track, clay veins in coal, retimbering bad roof, waiting for the roof to cave, failure of direct-current or of purchased power, irregularity of tippie operation, delayed delivery of railroad cars to tippie due to cold weather or car shortage. Of these 720 hours, 518 are chargeable to the disaster on No. 15 face. Somewhat over 18 per cent of the total time was lost from incidental delays.

Unit 2-T was worked in all eight faces of which two were headings and six were rooms. The loading of 10,365 tons of coal consumed 6,554 man-hours including all the work incidental to loading. This is equivalent to 1,296 tons per face and 12.7 tons per man per 8-hr. shift. At No. 4 face the men averaged only 7.37 tons per man-shift. This was a heading, where, on account of the bad roof, the place was driven narrow, top slate was taken down and permanent timbering set. Not including the work on No. 4 face, the men averaged 13.27 tons of coal each and 1.4 tons of top slate handled per 8-hr. shift.

With a 41.7 per cent reduction in the tonnage rate, the earnings were 6.9 per cent more net than the average net wage on the old system. The men lost 225 man-hours due to incidental delays which figure, however, does not include the time lost on No. 4 face on account of heading deadwork. The incidental delays represent 3.4 per cent of the time spent on the faces. The crew, as a whole, has been unable to attain due co-ordination in its efforts. Two or three men in the crew have been replaced.

Unit 3-T has completed eight faces of which five were headings and three rooms. All the work connected with loading was performed in 5,407 man-hours. The total output was 10,200 tons of coal, 1,150 tons per face, 15.1 tons of coal loaded and 1.2 tons of top slate handled per man per 8-hr. shift. With a 41.7-per cent reduction in the tonnage rate, the earnings were 21.6 per cent more net than the average net under the old system. Incidental delays caused a loss of 111 man-hours, somewhat over 2 per cent of the total.

SUMMARY OF WORK IN 42-IN. COAL

I have given a summary of the work done by three units, all working in one mine and in coal 42-in. thick. In all, thirty-six places were driven, 43,945 tons of coal were loaded, 1,220 tons per face or an average of 13.87 tons per man per shift. Not including the No. 4 face worked by unit 2-T where it was necessary to delay machinery in order to shoot roof and erect timbering and considering only thirty-five of the faces, the crews average 14.44 tons of coal loaded and 2.0 tons of top slate handled per man per 8-hr. shift.

Unit 1-J has completed ten faces in the B or Miller

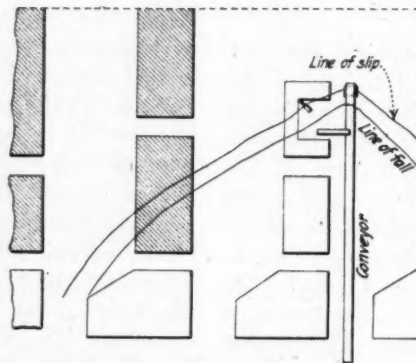


Fig. 2—Slip Brought Disaster

The first room, that in the center, and its pillar worked out well; the next room was driven to destination and when the pillar was two-thirds completed a cave came almost without warning. The slip that caused the trouble extended across three rooms.

seam of coal which is full of rolls and has a thickness ranging from 23 to 44 in. Four were in old work and six in new, all of which were rooms and pillars. In general, the roof conditions were good, although some bad roof had to be taken down and 1 to 2 in. of slate which came down with the coal had to be handled.

The first three faces were new rooms turned at 53 ft. centers and driven 215 ft. to the outcrop. The next four faces were extensions of old rooms which had been standing, having been laid off at 50 ft. centers and driven an average of 115 ft. The other three faces were new rooms driven at 53 ft. centers. In this work 6,898 man-hours were consumed in loading 11,127 tons of coal, 1,113 tons per face and 12.9 tons per man-shift. With a 41.7-per cent reduction in the tonnage rate, the earnings were 44.9 per cent more net than the average net under the old system. Incidental delays lost 256 man-hours, somewhat less than 4 per cent of the time spent. The operating of this coal has been extremely difficult, and I do not know any other way in which it could, at this time, be economically worked.

LOADED 1.75 TONS PER MAN-HOUR

The four units had completed up to April 1 forty-six faces and loaded 55,072 tons of coal. In doing this work, 31,408 man-hours were consumed, an average of 14.03 tons of coal loaded, 1.74 tons of top slate handled per man per 8-hr. shift, 1.75 tons per man-hour and 1,197 tons per face. In the total elapsed time, 1.21 faces per month have been finished. On the old system, as nearly as I can estimate, 0.3 of a place was finished per month providing it worked steadily which was not the case by any means. In 7-ft. coal, instead of 3½-ft., it would be reasonable to expect that 2½ tons of coal could be loaded out per man-hour on the loading units.

Up to April 1 only one lost-time accident had occurred. This happened a month after the installation of the

unit. A piece of top slate fell on a man while he was shoveling coal, causing a contusion of the lower side. The injured man lost thirty-five days of work. The most anxious time is after three faces have been completed in a new section and the pillar of the third place is being brought back. When that pillar is two-thirds extracted the roof works from 6 to 10 hr. and then caves to a great height. Thereafter the caves occur after finishing each room and pillar and before the next pillar is started.

In projecting headings the room length should be considered after the width of the room and of the pillar have been determined, with the intention of having the workings cave after the completion of the room and the removal of the

machinery. Unit 1-J had a cave at each face when the pillar was half-way drawn.

It is only natural to expect opposition to any new machinery and its application to mining. The men, as a whole, who are to operate the machinery and use the new methods are those most opposed to the changes, although frequently one of them will originate some excellent improvement in the manner of operation. The mine owner also is likely to receive some criticism upon his attitude of letting the other fellow do the experimental work.

LOWERING COST BY LARGER OUTPUT

Everyone had been reducing costs by increased production per unit operation. This way of lowering expenses has afforded about as great a saving as one can expect from it for the time being. The next item to be attacked is the cost of mining, in other words, the labor cost per ton of coal loaded on board the mine car at the room entry. The deadwork item, especially in low-seam mines is another cost which offers possibilities of improvement. Either or both of these items can be attacked to advantage. There is but one way in which the problem of high cost of mining can be attacked and that is by saving some of the energy wasted at the face in the loading of coal.

Concentrated work also lends itself to supervision. The tonnage per faceman must be increased and that increase must be attained with no more, or with less, expenditure of physical effort than was previously used. Less energy is needed to unload a shovelful of coal into a carrier 12-in. high than into one 36-in. high. If the taking of a step can be made unnecessary, if the pitching effort entailed in shoveling can be lessened and if the clearances between the top of the carrier and the roof can be made more adequate, the efficiency of the work can be increased. Double shoveling of coal is a wasteful expenditure of time and energy.

MOVING COST THREE CENTS PER TON

During the loading of 55,072 tons of coal, forty-six different faces were worked. Hence the equipment was moved forty-six times. This cost 3c. per ton. The cost for repair parts for conveyor equipment was 1.14c. per ton and for other machinery parts, including mining machine, fan, hoist, and wiring, etc. 1.41c. per ton. The cost of power was 1c. per ton. The conveyor delivers a ton every 3½ min., the mining machine undercuts a ton every 1.6 min., the hoist runs 20 sec. per ton, and the fan and floodlight run steadily. Explosives and carbide cost 2.46c. per ton which may be reduced by purchasing the material in large quantities.

Allowing 25 per cent for interest and depreciation on the total investment of \$8,000 the total cost is 11.53c. per ton. Taking these costs and adding thereto the labor cost the saving is 25 per cent in the cost of coal on board mine car in trips at the room entry.

It is difficult to determine what the other savings will be. At the mine where the three conveyors are in operation and where the conveyors are handling less than 40 per cent of the normal capacity of the mine, the total deadwork cost has been 8.63c. per ton for the last eight months. In 1924 the cost of deadwork, at this mine was 25c. on every ton of coal produced. The saving has been due to the elimination of all deadwork in rooms and the reduced amount of development necessary with concentrated work. Formerly sufficient development had to be maintained to take care of five to six times

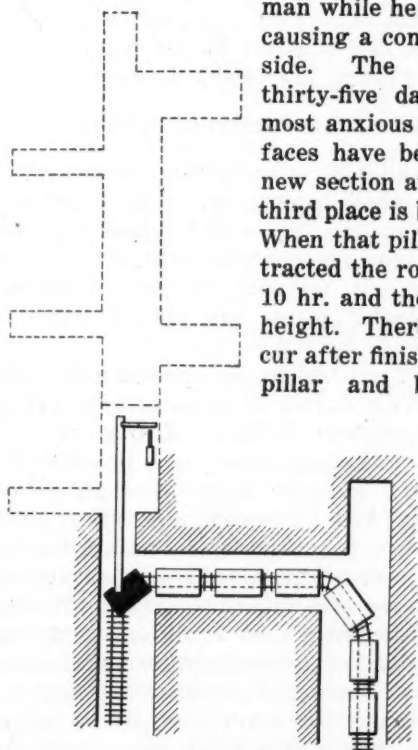


Fig. 3—Entry Driving Methods

As soon as one heading is advanced 250 ft. the equipment is moved to the parallel heading and two yardage men brush the roof and lay track in the first heading.

the number of places now required.

It is difficult also to ascertain what reduction of operating, maintenance and total labor costs this new system will effect. So far there is a pleasing result. When I make comparison with the costs of six other mines to which I have had access and which work under similar operating conditions and have the same labor rates, I find that the piece-work labor cost

was 35.3 per cent less, the operating labor cost was 11.4 per cent less, the mine maintenance cost 0.3 per cent less and the total mine labor cost, which includes superintendents, engineer and mine-office costs, was 24.4

PERFORMANCE OF PAN CONVEYORS LOADING COAL IN ROOM-AND-PILLAR MINING

Thickness of Coal, In.	Unit No.	No. of Faces Worked	Tonnage	Man Hours	Man Hours per Ton
42	1-T	20	23,380	12,552	0.5369
42	2-T	8	10,365	6,554	0.6322
42	3-T	8	10,200	5,407	0.5301
42	...	36	43,945	24,513	0.5578
23-44	1-J	10	11,127	6,898	0.6199
Grand total.....		46	55,072	31,411	0.5704
Delays*					
42	1-T	6	6,009	720	0.1198
23-44	1-J	10	11,127	256	0.0231
Grand Total.....		16	17,136	976	0.0570

*Figures included in loading performance. Delay figures were kept only for the two cases shown.

per cent less at the mine operating the conveyor system.

This comparison covered the last eight months to April 1 during which time three units have been in operation at "T" mine but in which some tonnage was mined and paid for under the old method. "T" mine operated as stated at a 40 per cent capacity, whereas the other six mines were dumping their normal daily production.

It now appears that methods other than hand shoveling into conveyors can be considered. In the accomplishment of this step, the elimination of the mining machine and the use of explosives can be expected.

Blending of Coal Necessary For Best Results

Coal May Swell Too Much or Too Little—Non-Coking Coal Valuable for Making Coke and Under Boilers in Reducing Smoke

A certain proportion of coal is suitable for coking—that is, possesses resinous or cementing constituent sufficient in quantity and suitable in character to bind the whole mass of the charge into a homogeneous and coherent coke without undue swelling and reduction in density. Non-coking coals, however, may be of two classes, the more common of which has a deficiency of cementing material, giving a carbonized residue that is powdery. The second class of non-coking coal may, on the other hand, contain such an excess of resinous material that it causes the charge to swell unduly, giving porous and soft coke.

Professor S. W. Parr, with his associates at the University of Illinois, was the first to prove conclusively, by his investigations commenced in 1902, that, in order to obtain a coherent coke, the original coal must contain not only just the right quantity of resinous material, but this constituent must also have a definite melting point, generally about 662 to 842 deg. F. (350 to 450 deg. C.) and the property of not decomposing until at a temperature considerably above the melting point, so that the viscous stage can be retained for some time, thus enabling thorough penetration and mixing to take place. Incidentally, it may be pointed out that the mechanical structure of the raw coal plays a more important part in the production of good coke than is generally supposed, as shown by F. C. Keighley.

The general method of blending as developed on scientific lines by Parr is of the greatest importance, as it increases considerably the quantity of coal available for the production of a high-grade coke. It is already common practice today to crush, grade, wash, and dry the coals, and to compress the charge in the oven before

carbonization, and by the adoption of the further process of blending, great improvements result. The mechanical operation of the ovens is improved, for coals with slightly too much resinous material cause a severe strain on the walls and general setting because they swell unduly, and the friction and resistance on discharging increase the wear and tear and cost of repairs.

In the matter of blending the British coke-oven industry is lagging behind both the United States and the Continent. It would be a good national policy for Great Britain to divide the colliery districts into areas according to the qualities of coal produced, have a few large modern coking plants, blend all the coal received from the many different collieries and produce a more uniform quality of coke, which probably also would allow the use of about 25 per cent of small non-coking coal, at present practically a waste product.

BLENDED HELPS CARBONIZATION PLANTS

The adoption of suitable carbonization processes with the aid of blending would be of great value in enabling coke-oven installations to be usefully employed for turning out smokeless, free-burning fuel for various markets in slack periods, for with the present general methods, many valuable plants are always liable to stand idle as the trade fluctuates.

Blending makes it possible to use the low-grade and refuse coal at collieries as well as the coke breeze from coke-ovens and gasworks. Millions of tons of coke breeze have been thrown away as refuse, a practice still in vogue even today, in spite of the fact that such material is excellent fuel for steam generation when blended with coal or coke, just as is fine anthracite.

A certain limited proportion of coal is available which is so exactly constituted with regard to the quantity and quality of its volatile content that it will answer to the much more severe test of low-temperature carbonization at, say 1,000 to 1,200 deg. F. (540 to 650 deg. C.) without any compression or other preliminary treatment of the charge, and give a dense and non-porous free-burning smokeless product with, say, 10 per cent volatile matter.

Abstract of article read by David Brownlie, of the Iron and Steel Institute, of Great Britain, entitled "Coal Blending."



Underground Operation



Should a Mine Fire Be Fought Direct Or Should It Be Sealed?

Opinions vary as to the expediency of fighting a fire by direct means or by sealing, according to J. T. Ryan, general manager, Mine Safety Appliances Co., who sent a questionnaire to several operating officials, mine inspectors, mining engineers, U. S. Bureau of Mines officials, directors of safety and general mine-rescue stations.

The answers showed that the anthracite operators were unanimously in favor of fighting their fires direct. At one colliery, all equipment and plans have been made for this procedure. Direct methods, the anthracite operators say, should be continued as long as there is a reasonable degree of safety—that is to say while there is little risk of explosion.

Of the bituminous operators 82 per cent declare that fires should be fought direct until conditions make it necessary to seal them off. Other bituminous operators, however, are not decided as to the proper procedure. A few, including operators of lignite mines, would seal off in most cases. In general, however, they recognize that every mine is a problem in itself and what should be done depends on conditions especially on the stage that the fire has reached.

CONDITIONS GOVERN

Some soft-coal operators that would fight the fire direct consider that the position, intensity and extent of a fire and the facilities and supplies for fighting it immediately should govern the procedure. Fires that are in an incipient stage are relatively easy to control, but when they have been burning several hours there is danger of explosions of gas or of falls of roof. Safety should be the first consideration, and one engineer declared it to be his be-

lief that more men are killed or injured in sealing fires than in fighting them direct.

One said that if the fire were on a main haulage way it may be fought without sealing, but if it were in the midst of other workings it should be sealed at once. Another declared that, if the fire were at the face of a heading or a room, the direct method of fighting it should be tried first, but, if it were along the heading or around say a side track or pumphouse and had a fair start, it should be sealed off at once. A third said that he always fought a fire at the face of a working and usually with success, but in worked-out and caved areas he regarded direct fighting of fire hopeless as the places had usually caved too high. Such places were sealed at once.

BREAKS IN SURFACE

Another remarks in his reply that it is not practicable to seal fires in many instances because of breaks to the surface where the fire occurs in pillar or outcrop work or where no effort has been made to isolate panels. However, even there, the first efforts should be made to fight the fire direct.

"Gob fires," says a fifth respondent, "when in worked-out areas can seldom be reached and adds that in his mines, which are subject to such fires, the workings are so laid out that they may be sealed in small

areas with few seals, generally not more than four and sometimes only two.

Several operators, however, were insistent on the importance of sealing, one saying that to fight a big fire direct was a waste of time and money and urging that no chances should be taken in an effort to fight the fire direct and a third declaring that at most mines equipment was not available for fighting fire direct making sealing necessary nine times out of ten.

DELAYS SEALING

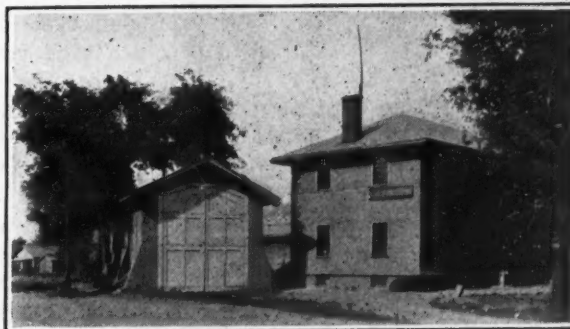
Another seals a fire off as soon as carbon monoxide is found by analysis in the return and yet another declares that if the gas hazard is not great he endeavors to extinguish the fire direct.

An Englishman replies that in longwall workings such as in the Barnsley seams of South Yorkshire it is the practice to dig out the fire, sealing being practiced where digging out has failed. In the bord-and-pillar workings in the thick coal of Staffordshire, sealing is employed because digging out would be useless.

Mr. Ryan himself says that a fire at or near a face in a section that is liberating a large quantity of methane should be fought direct until every means is exhausted because there is less hazard, other than a slight explosion, if the ventilation is properly controlled, then there would be in sealing. But this means that a fire such as this has been anticipated, and that the mine has on hand sufficient fire-fighting equipment.

Illinois Mine Rescue Station

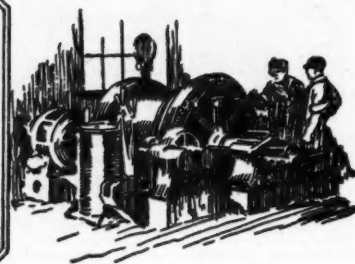
Located at Benton, within easy distance of the big producers of Franklin County. It was erected about six years ago by the State Department of Mines and Minerals. The equipment includes a rescue railroad car and smoke gallery. There also are facilities for lectures and living quarters for a superintendent.



From an article read before Operating Officials Convention of American Mining Congress.



Practical Pointers For Electrical And Mechanical Men



"Stolen," Faces User of Questionable Lamp

When employees' houses are lighted from the same voltage as is used in the mine, there is generally much annoyance and expense from theft of lamps. Even with the more common condition, 110 volts in the houses and 250 volts in the mine, it is not unusual to find the company using the less desirable 250-volt lamps in outside buildings in order to discourage theft.

Another case where theft is common is where 125-volt lamps are used in locomotive headlights. They may be connected two in series across 250 volts; singly in series with a suitable resistance; or on battery locomotives, directly across approximately 50 cells. These special lamps are often carried home for use on the 110-volt lighting circuit.

A simple and relatively inexpensive method of preventing or at least greatly reducing theft of lamps is to etch an identification on the glass. A particularly effective form of identification marking which is now being used by a number of coal companies is that shown in the illustration. This 50-watt, 250-volt lamp carries in large letters "Stolen From Glogora Coal Co."

The illustration is from a photograph taken at the Glo No. 1 mine on Right Beaver Creek in the Big Sandy field of Kentucky. Here, be-



Lamp on Extension Cord at Shop

All lamps charged to company use have this marking. The wording does not let the unrightful user forget that the lamp is not his.

cause of the use of a direct-current generating plant, the house lighting is operated at 250 volts, the same voltage as used in the mine. Before the marking of lamps was adopted, this fact made theft almost continual.

Only those lamps charged to company use are etched. This is done at the mine with a rubber-stamp outfit which cost \$14. The time required for etching is hardly more than that required to take the lamps out of the carton and put them back. With lamps costing 30 to 60c. each, the saving of a comparatively few from theft pays the cost of the outfit.

Sketch Explains Polyphase Rotating Field

How a revolving magnetic field is produced in a polyphase induction motor, and therefore just why the motor runs, is a mystery to many electricians and even to some college-trained electrical engineers. From the practical standpoint it is quite useful to have a thorough understanding of the action. The explanation is commonly considered rather complicated, and as usually attempted, is difficult to comprehend.

The following method, which was devised by the electrical engineer of a coal company as a check of the connections of a certain motor, is a method which has enabled a number of electrical men to gain a thorough understanding of the polyphase induction motor.

SKETCH HELPS UNDERSTANDING

When one has sketched the action of a specific motor through a complete cycle or more, one can "almost see" the revolving field and is not likely to forget the action. The thorough understanding puts one in a position to check the winding of any polyphase motor. The upper drawing, Fig. 1, is the copy of the winding sketch which an electrician made when stripping a motor for rewinding. The electrical engineer in checking the sketch noticed the unsymmetrical arrangement and

doubted if the sketch was correct. Fig. 2 is the diagram which he developed to prove to his own satisfaction that the motor would run if connected as indicated by the electrician's drawing.

The motor is 60-cycle, 3-phase, single-Y connected; has 18 coils and

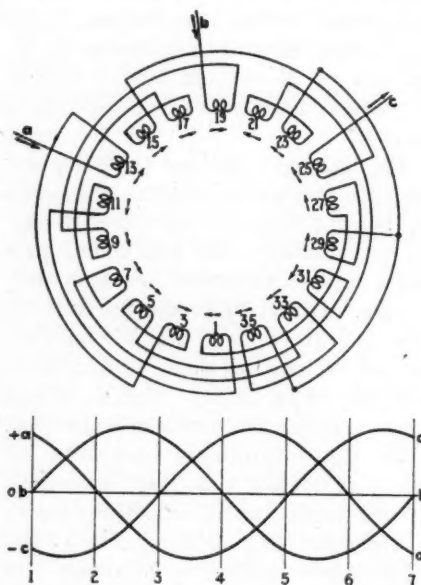


Fig. 1—Diagram and Phase Relation

The upper sketch is a typical example of the diagram which a winder makes when stripping a stator ready for rewinding. The lower shows the relative current values and directions in the three phases during one cycle.

36 slots. The coil pitch is 9, or in other words the coils go in slots 1 and 10. Each slot contains but one coil instead of containing the top of one coil and the bottom of another, as is usually the case.

The odd numbers 1 to 35 in the upper diagram, Fig. 1, represent the 18 coils, and the numbers 1 to 36 in Fig. 2 represent the 36 slots. The "top" of coil "1" goes in slot 1, the "bottom" in slot 10; the "top" of coil 3 in slot 3, the "bottom" in slot 12, and so on.

SINE-WAVE DIAGRAM

The lower sketch of Fig. 1 is an assumed sine-wave diagram of the current in each of the phases, a, b and c. One complete cycle is pictured and a number of instantaneous

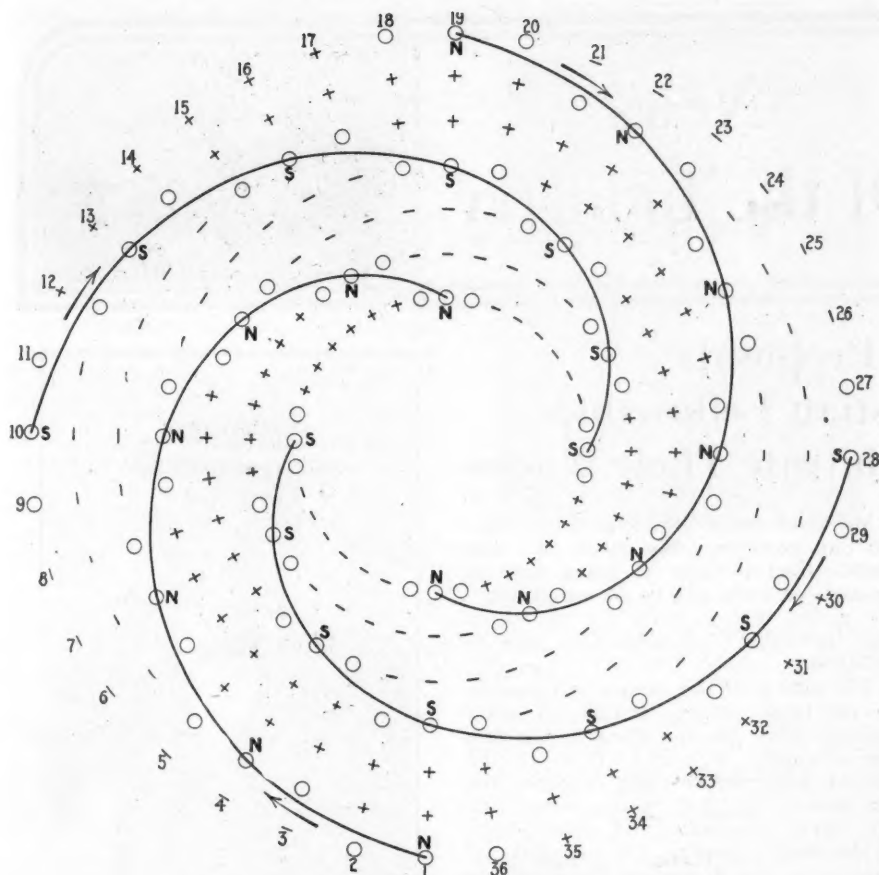


Fig. 2—Development Showing Rotating Field

The zero and polarity signs each indicate the conductors in a slot and the respective current direction. Each of the seven circles represents the instantaneous values in the complete winding at the instants 1 to 7 of the sine-wave diagram. The largest circle is instant 1 and the smallest, instant 7. The regular and progressive movement of the poles is a sure check that the connections are correct.

positions selected. The positions are represented by the numbers 1 to 7. Beginning with the largest, the seven circles of plus and minus signs in Fig. 2 represent the current directions in each slot for the respective instantaneous position of the lower diagram of Fig. 1.

The diagram, Fig. 2, was developed in the following manner: First, consider the instantaneous position 1 of the sine-wave diagram. At this instant there is no current in phase *b*, therefore a 0 is marked at each slot (outer circle Fig. 2) in which the coils of phase *b* are located. At the same instant phase *a* is positive, therefore a plus sign is made in each slot where the "tops" of phase *a* are located and a minus sign in each slot where the bottoms rest.

GROUPING IS SIMPLE

The current in phase *c* is negative, so a minus sign is marked at each top *c* slot and a plus sign at the bottom. The outer circle of current polarity signs is then complete and consists of regular groups. Slot 19 is in the center of a 0 zone to the left of which is a positive zone and

to the right a negative zone. The lamination then has a pole with its center at slot 19. This pole is indicated by *N* and the other pole centers by *N* and *S* respectively.

The direction of current in each phase for instant number 2 is next plotted, and forms the circle next to the outside. By this time the center of the north pole has moved from slot 19 to slot 22. Plotting the other five instantaneous phase positions to form the remaining circles of Fig. 2, shows that the magnetic field has moved one-half of a revolution.

This rotation took place during one cycle, therefore the motor will make 30 revolutions during 60 cycles, or 1 sec. The synchronous speed is therefore 60 times 30, or 1,800 r.p.m. This, of course, checks with the fact that a 4-pole 60-cycle induction motor has a synchronous speed of 1,800 r.p.m.

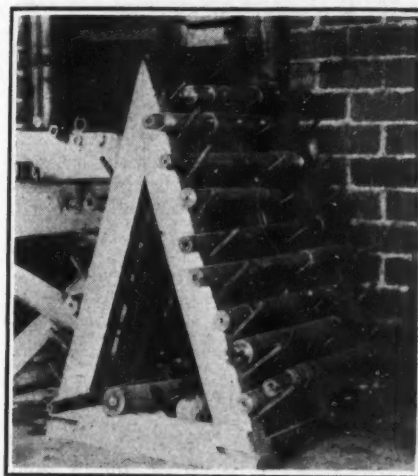
This method of showing diagrammatically the action of poly-phase currents in producing a revolving field appeals to the practical man because it includes all the windings or coils of an actual motor and, like a motor winding, is in the form of a circle.

Keep Shop Rack Filled with Spare Shafts

It is always well to have a stock of spare shafts for the armatures of direct-current equipment. The shafts of direct-current motors are usually subjected to a greater stress per unit of cross-section than those of alternating-current motors and therefore are more frequently broken.

To see a number of spare armatures stored in the shop on a triangular-shaped rack is not unusual, but to see this type of rack filled with spare shafts is uncommon. The rack shown in the accompanying illustration is that in the shop of the Edgewater Coal Co., at Hellier, Ky.

The shafts are chiefly those for mine locomotives and mining machines and are all for direct-current motors. They are made in the shop at times when there is a lull in the usual rush of repair work.




Assortment of Shafts on Rack

The rack consists of three wooden A-frames fastened together at the top and bottom, and with track spikes driven in the sides to hold the shafts. The center support makes the rack accommodate short as well as long shafts.

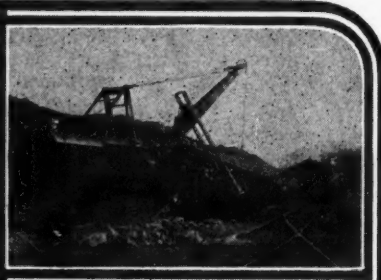
Pennsylvania Company Uses Antimony in Brasses

Quite a number of coal-mining companies which have central repair shops cast and machine their own bearing brasses. There is, however, a wide divergence as to the mixture formulas used, both in the variety of metals and their percentages.

J. F. MacWilliams, electrical engineer of the Pennsylvania Coal & Coke Corp., Cresson, Pa., uses the following formula when casting brasses from new metal: Percentages by weight, copper 80, tin 10, antimony 10. He has found that this makes an alloy which is low in friction and has superior wearing qualities.



News Of the Industry



British Miners Accept Proposals Of Industrial Christian Fellowship That Would Arbitrate Their Wages

Much to the relief of everyone in Great Britain the British miners at their delegates' conference, July 30, cast aside their slogan "not a penny off the pay; not a minute off the day," and consented to accept arbitration. That is a step toward settlement, but as the proposal of the Industrial Christian Fellowship which they approved called for the continuance of the subsidy for four months and as the British Government has repeatedly declared its opposition to any subsidy there is still some distance to be traveled either by the miners or the Ministry. Furthermore, the delegates are not plenipotentiaries; all they voted was to refer the mediation proposals to the districts for ratification, the vote regarding which must be completed by Aug. 7.

Long and heated discussions preceded ratification, one of the efforts made by the opponents of the plan being to pass a vote of censure on the executive for adopting the proposals. This was defeated.

The points of the memorandum on which the district miners' associations will vote are: (1) The immediate resumption of work with hours and wages as before stoppage; (2) a national settlement within four months and a subsidy during this period; (3) the reorganization scheme and wages to be worked out in detail by the Coal Commission and to be incorporated in legislation, the four parts of the reorganization scheme capable of early application to be put immediately in operation; (4) matters still in disagreement after four months to be settled by a joint board with an independent chairman whose award is to be accepted by both parties.

Eight-Hour Day Thrown Out

The delegates were emphatically assured that the owners' eight-hour day proposal would not be allowed to go to arbitration. This also seems contrary to the wish of the British Government as is testified to by the legislation it has just introduced making an eight-hour day within the law.

Durham and Northumberland showed themselves obdurate, the vote of censure being introduced by their delegates. Both Herbert Smith, the president, and A. J. Cook, the secretary, impressed the delegates with the fact that the miners could no longer take a stand against arbitration.

Mr. Cook remarked, "We must realize our position. We must face the facts. Coal tonnage is going against us and we have got to do something." He added that a reduction of wages was inevitable if a settlement was to be made.

The action of the miners is expected to conciliate public opinion, it being thought that the operators are taking too obdurate a stand. Conservative circles, however, strongly condemn the ten bishops and twelve nonconformists for their proposals and Dean Inge, Prebendary Gough, the Bishop of Gloucester and a leading Presbyterian, Archibald Fleming, score the Industrial Christian Fellowship for their meddling, though the Archbishop of Canterbury sanctions the movement.

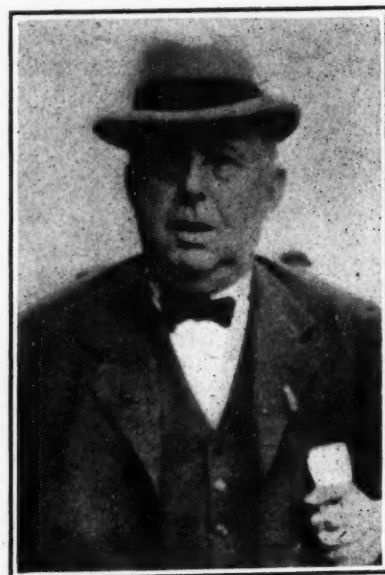
In the House of Commons a debate on the third renewal of the Emergency Powers act was marked by much bitterness. An amendment presented by the Labor members urging that certain of the emergency regulations be omitted was defeated by a majority of 133.

Safety Men Fearful

At Cwmcarn, in Monmouthshire, England, the safety men, who have been running the pumps and fans, have been charged with moving coal. Men and women have surrounded the homes of mine officials and safety men, and it seems likely that the pumps and fans which are stopped will not be restarted as the safety men have been afraid to return.

The Russians are beginning to declare that it is useless to continue to support the British "traitors," who despite contributions are not disposed to adopt methods that the communists approve. Russia has contributed about \$1,000,000 to the strikers and feels that unless the British workers measure more closely up to communist standards it would be ill-advised to support them. After all it is realized the lowest monthly wage of British miners is twice that which Russian miners receive. It seems likely that the meeting of the Anglo-Russian Joint Labor Committee in Paris will result in a break in relations.

The British miners' delegation to the United States sailed July 31, one of the delegates being Miss Ellen Wilkinson, a Laborite Member of Parliament. They will meet President Green and other officials of the American Federation of



Herbert Smith Dons Hat

The British Miners' Federation executive created a sensation recently when he appeared at the executive meeting of the organization minus his famous cap.

Labor and then will tour the mining districts of Pennsylvania, West Virginia, Illinois and Ohio seeking relief funds for the women and children of the striking miners.

On July 26 the House of Commons passed the third reading of the Mining Industry bill, providing for the reorganization of the industry. The vote was 312 to 125. Premier Baldwin, who had made preparations for his annual trip to Aix-les-Bains, has cancelled his reservations and despite his ill-health will remain at his post. He still believes that the operators and miners should come together without government interference.

Business has improved so greatly in Westphalia, due to the strike in England, that the mine workers are asking an increase in wages, the amount of which has not been determined. It is expected that it will be about 15 per cent. Since last November Westphalian miners have been making less than \$2 a day. The miners have given notice that the present wage agreement will terminate at the end of this month.

Island Creek Earnings Climb.—The Island Creek Coal Co. reports for the six months ended June 30, 1926, net profit of \$1,417,497 after depreciation, depletion and federal taxes, equivalent, after dividend requirements on \$6 preferred stock, to \$10.67 a share earned on 118,801 shares of common stock. This compares with \$937,041, or \$6.62 a share, in the first half of 1925.

Funds Needed for Economics In Bureau of Mines

While the regulations of the Bureau of the Budget preclude any announcements of the amounts being asked for the work of the next fiscal year, it is assumed that the Bureau of Mines will request material increases in its appropriations.

The principal reason for transferring the Bureau to the Department of Commerce was to emphasize the business side of mining. Heretofore, the Bureau has been engaged in research and in such administrative functions as its mining safety service.

The technologic and safety activities of the Bureau are well started, with a record of fifteen years of growth. Some modification is under way in the conduct of those activities, but the principal problem of the next fiscal year is to carry on. An efficient staff is at work. In those branches the expansion is confined largely to expansion commensurate with the growth of the industry.

On the other hand, the work of the economics branch is in a pioneer stage. The statistical units of the Geological Survey and of the Bureau of Mines had collected reliable figures of production and of accidents, but the men in that work made no effort to keep up with the business side of mining. The coal and minerals divisions of the Bureau of Foreign and Domestic Commerce have done some work on the foreign trade in minerals, but even that has gained no great momentum.

White Recently in Coal Industry

The present personnel of the economics branch consists essentially of the clerical forces of the old units, which were consolidated, plus a few men of professional grade. Three or four of these men have attained reputé as engineers and geologists, but only one, C. P. White, has had responsible business experience, and only Mr. White could qualify as having come recently from the ranks of the mining industry. In fact, the staff of specialists is much weaker now than when the mineral statistics were gathered by the Geological Survey. The geologists assigned to that work, though not business men, had acquired a real insight into the industries to which they were assigned. With two exceptions, these geologists were not transferred to the Bureau of Mines. In consequence, the branch needs at least six first class men from the industries simply to put the work back on the plane it had reached before the transfer.

The appropriations for 1926-27 barely are enough to carry the present personnel. No new work of significance can be hoped for from this staff. It is composed largely of skilled clerks, with years of experience at just what they are doing. They already are turning out all the work of which they are capable. No increase in outlook can be brought about simply by rearranging the same force in a new department.

No significant progress can be made without more appropriations. Unless they can be attained, it is quite clear that the economic work of the Bureau of Mines will do little more than continue the familiar production statistics



C. P. White

of the Geological Survey under a new letterhead. The subjects of consumption, distribution, markets and stocks will remain untouched.

This seems particularly unfortunate with respect to coal, in view of the troubled days through which that industry is passing. Regardless of whether Congress passes fact-finding legislation, nearly everyone agrees that more figures are needed on coal stocks, distribution, consumption, prices and marketing. If this appropriation can be obtained, not for the coal work in particular but for the economics branch as a whole, it will enable the Bureau to go ahead quietly without controversy on constructive work for the coal industry.

Industrial Coal Stocks For 31 Days on July 1

A slight building up of industrial coal stocks on hand during June is indicated by the monthly survey of the National Association of Purchasing Agents. The total stocks as of July 1 are estimated at 35,704,000 tons, which would be sufficient for 31 days at the rate of consumption during June. This compares with 28,196,000 tons on June 1, or 23 day's supply.

Industrial consumption during June totaled 34,941,000 tons, or an average of 1,164,000 tons daily. Renewed industrial activity checked the decline of the preceding month.

Comparative Estimates of Output, Consumption and Stocks

	Output	Industrial Consumption	On Hand in Industries
February...	48,654,000	43,747,000	66,190,000
March...	54,038,000	46,313,000	60,014,000
April...	48,008,000	39,048,000	49,150,000
May...	47,113,000	35,213,000	36,876,000
June...	50,417,000	34,941,000	33,918,000
July 1			35,704,000

Days' Supply on Hand July 1 in Selected Industries

Steel plants.....	26
Electric utilities and coal-gas plants	37
Byproduct coke plants	14
Railroads	26
Other industries	33

A.I.M.E. Will Inspect Clairton Byproduct Plant And Experimental Mine

Preliminary announcement has been made by the American Institute of Mining and Metallurgical Engineers of its 134th general meeting to be held at Pittsburgh, Oct. 6-9. On Tuesday, Oct. 5, round tables on the combustibility of coke and the method of testing coke will be held in the morning and afternoon respectively in the auditorium of the U. S. Bureau of Mines. On Wednesday the general meeting and a reception with organ recital will be held in the Carnegie Music Hall. President S. A. Taylor will give the address of welcome, and Julian Kennedy will respond.

On Wednesday the coal and coke session will be held in the Carnegie Institute Lecture Hall. That evening a smoker will be provided. On Thursday an all-day trip up the Monongahela River will give the members an opportunity to see the Clairton byproduct plant, the largest in the world.

On Friday a coal and coke session will be held in the Carnegie Institute Lecture Hall and one on mine ventilation in the U. S. Bureau of Mines Auditorium. In the afternoon a coal-dust explosion will be staged in the Experimental Mine, Bruceton, Pa. In the evening a reception will be given by President and Mrs. Taylor at the Hotel Schenley, the headquarters of the institute. This will be followed by the annual banquet. Arrangements have been made for trips on Saturday to suit individual needs and wishes.

Among the papers presented will be one giving a general description of the Pittsburgh coal bed in Pennsylvania, Ohio and West Virginia, prepared by a special committee of the Pittsburgh section. Another will describe the methods of mining contributed by a similar committee. A third, by Chester M. Lingle, will describe the coal-mining plant of the Buckeye Coal Co. at Nemacolin, Pa. Ancel St. John will address the meeting on "X-Ray Studies in Coal;" J. A. Garcia, on "State Coal-Mining Laws Concerning Mine Ventilation;" H. M. Chance, on "Appraisal of Coal Property Values;" Frank Haas, on "Occurrence of Firedamp in Bituminous Coal Mines;" G. E. McElroy, "On Mine-Air Flow;" G. St. John Perrott, on "Factors in the Ignition of Methane and Coal Dust by Explosives," and F. Ernest Brackett, on the "Application of Kutter's Formula to Gases." Many other papers, principally relating to steel, also will be presented.

Anthracite Circular Prices For August at New York

(Per Gross Ton f.o.b. Mines)

	Broken	Egg	Stove	nut	Chest-Pea
D.L. & W. Coal Co.	\$8.25	\$8.75	\$9.25	\$8.75	\$6.50
Phila. & Reading					
Coal & Iron Co.	9.15	9.15	9.40	9.15	6.50
Lehigh Valley Coal					
Sales Co.	8.50	9.00	9.35	9.00	6.00
Hudson Coal Co.	9.00	9.00	9.35	9.00	6.00
Lehigh & Wilkes-Barre Coal Co.	8.25	8.75	9.25	8.75	6.00
Lehigh Coal & Nav.					
Co.	9.25	9.25	9.50	9.10	6.35
M. A. Hanna Co.	9.00	9.25	9.60	9.25	6.50

Prices for buckwheat No. 1 are \$2.50 @ \$3; rice, \$2 @ \$2.25, and barley, \$1.50 @ \$1.75.

Cost of Locomotive Fuel Continues to Decline

Class 1 railroads of the United States consumed 7,844,354 net tons of coal in locomotives in freight and passenger service during May, 1926, according to a report by the Interstate Commerce Commission. Consumption by districts was as follows: Eastern, 3,761,260 tons; Southern, 1,879,870 tons; Western, 2,203,214 tons. In the corresponding month of 1925 the totals were 3,644,015, 1,786,545 and 2,144,457 tons, respectively, and 7,575,667 tons for the United States.

The average cost of the coal, including freight charges, for May was as follows: Eastern district, \$2.65; Southern district, \$2.17; Western district, \$2.97; United States, \$2.62.

In the Eastern district the average cost shows a decrease of 5c. per ton from similar figures for April. There is a decrease of 4c. per ton in the Southern district; an increase of 3c. per ton in the Western district, and a decrease of 3c. in the average for the United States.

Compared with May, 1925, decreases appear in the averages as follows: Eastern district, 14c.; Southern district, 8c.; Western district, 7c.; United States, 11c.

Attachment of Union Funds Quashed in Arkansas

Writs of garnishment and attachment issued Dec. 11, 1925, by the federal court at Fort Smith, Ark., which tied up funds of District 21, United Mine Workers, have been quashed by federal Judge Frank A. Youmans in an order sustaining motions of the defendant miners. The order released district funds amounting to several thousand dollars.

Writs were issued in the suits of the Greenwood Coal Co. and other coal companies against the district under the Sherman act, asking for \$1,080,000 damages for alleged destruction of property and losses through alleged activities of the miners when the coal companies began operations under the 1917 wage scale.

Judge Youmans held that the remedy of attachments and garnishments is not available against property of an unincorporated association such as District 21. The court quoted the ruling of the Arkansas Supreme Court holding that appointment of a receiver for the district by the Sebastian Chancery Court was illegal on the same grounds.

Fuel Engineers Wanted

The U. S. Civil Service Commission announces open competitive examinations for fuel engineer, \$3,800; associate fuel engineer, \$3,000, and assistant fuel engineer, \$2,400. Applications must be on file at Washington, D. C., not later than Sept. 7. Vacancies are to be filled in the Bureau of Mines for duty at Washington, D. C., and Pittsburgh, Pa. After the probational period required by the civil service act and rules advancement in pay may be made up to a maximum of \$5,000 a year for fuel engineer, \$3,600 for asso-

Water Power Growth Adds To Coal Ills

One of the most important causes which contribute to the present serious situation in the coal industry is the rapid development of the use of water power. Little attention has been given to this means of power production, according to advices received by the Bankers Trust Co. of New York from its British information service, which reports that while in 1920 Europe was using 23,000,000 hp. generated by water power, the figure rose to 29,000,000 hp. by the end of 1923 and today more than 35,000,000 hp. is being used. Partly as a result of this the world output of coal has remained stationary for the past three or four years at about 1,250,000,000 tons a year, while the demand for heat, light and power has been increasing steadily.

ciate fuel engineer, and \$3,000 for assistant fuel engineer. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. Civil Service examiners at the post office or custom house in any city.

Penalty for Illegal Mining On Public Lands

So that a specific penalty may be provided for the illegal removal of coal from public lands Congress has enacted and the President has approved the following law:

"That it shall be unlawful to mine and remove coal of any character, whether anthracite, bituminous, or lignite, from beds or deposits in lands of the United States, or in deposits or beds reserved to the United States, with the intent wrongfully to appropriate, sell, or dispose of the same, and every person who shall violate any of the provisions of this Act shall be deemed guilty of misdemeanor and fined not more than \$1,000 or imprisoned not more than one year, or both. Nothing in this act, however, shall interfere with any right or privilege conferred by existing laws of the United States."

Wide Field for Briquets Seen in China

Hongkong, July 1. — "During the year," the chairman of the Asia Coal & Briquetting Co., Ltd., reported to shareholders at the annual meeting just held here, "experiments have been carried on for the perfecting of a coal briquet designed to take the place of firewood in Chinese kitchens, and we now have a formula for an article which is a satisfactory substitute for firewood and which will cut the cost of fuel by 50 per cent when sold at a figure that will net the company substantial profit. This opens up a new and almost unlimited field in China."

Hampton Roads Dumpings In July Break All Records

Coal dumpings at the Hampton Roads piers in July surpassed all previous totals for the port and are believed to have established a world's record. The record was broken by July 27, when the three piers had dumped 2,272,000 tons. Total movement over the piers for July was 2,755,556 tons. The dumpings by piers were: Norfolk & Western, Lamberts Point, 1,068,682 tons; Chesapeake & Ohio, Newport News, 953,538; Virginian, Sewalls point, 733,336 tons.

The nearest approach to this tonnage was in June, 1921, when 2,210,826 tons went over the three piers. All the piers broke all their own records last month, working 24 hours a day on each of the 31 days and with more ships awaiting cargo than could possibly be served with dispatch.

While the bulk of the coal movement was to the United Kingdom, in filling contracts for the British Government, the movement to Italy, South America and other scattered countries was heavy. Several cargoes went to Wales, the very heart of the British mining country.

Aside from the jump in business at the terminals, and the increase in the railroads' operations, the boost in coal movement has been of incalculable economic benefit in the southwestern Virginia coal fields and in some of the West Virginia sections where activity had been at a low ebb earlier this year. In some of the southwestern Virginia fields the movement of the last two months has given mines the only steady operations of the year.

West Virginia Will Celebrate Safety Day

So far as coal mining is concerned, Aug. 21 has been declared a state-wide holiday by the West Virginia Coal Association. Mining officials, miners and first-aid teams will assemble at Huntington on that date to observe the fourth annual first-aid contest and first annual Safety Day.

Camden, an amusement park, has been chartered for the event. Besides the many amusement features such as swimming, boating and free vaudeville acts, the program will include several addresses, a coal-dust explosion and a banquet in the evening. The committee expect to have Herbert Hoover, Secretary of Commerce, address the gathering. Other speakers will be Governor Gore and J. G. Bradley.

The day will begin with a parade at 9:30 a.m. Prizes will be awarded to the best floats. After the first-aid contest in the afternoon a battle royal will be staged. The idea of the day is to bring first-aid and mine safety before the eyes of as many people as possible.

The organization to handle the celebration is as follows: President, Robert M. Lambie, chief West Virginia State Department of Mines; vice-president, Walter H. Cunningham, secretary, West Virginia Coal Association; managing director, W. H. Forbes, U. S. Bureau of Mines, and secretary, H. E. Matthews, of Huntington.

Southwestern Operators' Publication Of Hoover Correspondence May Prove Boomerang When Congress Convenes

By Paul Wooton

Washington Correspondent of Coal Age

A recent statement furnished the press by the Southwestern Interstate Coal Operators' Association gave the impression that Secretary Hoover is endorsing a specific movement for setting up in the bituminous industry a tribunal for voluntary arbitration. Extracts quoted from Secretary Hoover's letter gave rise to the belief that another document as important as was his letter to the Pittsburgh Coal Producers' Association, written before the Jacksonville agreement, had been produced. A perusal of the entire correspondence, however, dispels all idea that Mr. Hoover's part in this activity of the Southwestern association is more than perfunctory.

W. L. A. Johnson, general commissioner of the association, on June 28 wrote Secretary Hoover as follows:

The attention of several operators who are members of the Southwestern Interstate Coal Operators' Association has been called to the statements that you made before the House Interstate and Foreign Commerce Committee last month. These remarks are quoted in a copy of the *Congressional Record* carrying an address made by the Hon. Adam M. Wyant, of Pennsylvania, in the House of Representatives on Tuesday, May 25, 1926.

The statements follow:

"The anthracite industry has taken the first steps of substantial peace in the industry over a term of years. Our major interest may be the bituminous industry. If the unionized section of that industry could set up its own mediation board in the same terms as the anthracite industry, I believe Congress would be well justified in suspending any legislative action."

"Most of our great industries upon the continuous functioning of which the public is entirely dependent—and there are a half dozen of them—have managed over a course of years to find a solution of their labor relationships. The bituminous coal industry is practically the only one that has not found some such solution."

My own feeling is that it might be well to give these folks an opportunity to see whether they can set up some sort of machinery of their own."

Several members of this association have asked me to write you on this matter as they are particularly interested to secure your views as to just what would be necessary for the unionized section of the bituminous industry to do in order to bring about a condition that would justify Congress, in your opinion, in the suspension of any legislative action.

You are undoubtedly familiar with the fact that the union operators of this section do not participate in the conferences at which the union scale of wages is agreed upon, which scale applies throughout the entire union field. In other words, we do not participate in the conference between

representatives of the operators in what is known as the Central Competitive Field and the officials of the United Mine Workers of America.

You can appreciate that the operators in the Southwestern states are vitally concerned in this matter and I know you will appreciate our desire to secure your views on this matter, dealing with your suggestions as to the establishment of a mediation board by the unionized section of the bituminous industry.

To this, Mr. Hoover, on July 17, replied briefly. The full text of his letter follows:

I have your letter of June 28 on my return to Washington. I enclose herewith a complete statement of my representation to the Congressional committee on the subject you mention.

I enclose also a copy of the agreement made between the anthracite operators and miners, which was somewhat the type of action I recommended. Such action could only be of value if carried out within the industry itself and not by intervention of the government.

Seeking Voluntary Arbitration?

In giving the statement to the press with a plea that it be given "the largest possible space," it is assumed that the Southwestern association is committed to the idea of voluntary arbitration for the unionized bituminous industry.

The text of the association's statement, bearing a release date of July 24, reads as follows:

Recommendation of an agreement somewhat similar to that which was entered into between the anthracite operators and miners last February, providing for voluntary arbitration, is made to the operators of the unionized section of the bituminous coal fields by Secretary Hoover of the Department of Commerce in a letter received today by W. L. A. Johnson, general commissioner of the Southwestern Interstate Coal Operators' Association, with headquarters in Kansas City. Mr. Hoover qualifies his recommendation by statement that: "Such action could only be of value if carried out within the industry itself and not by intervention of the government."

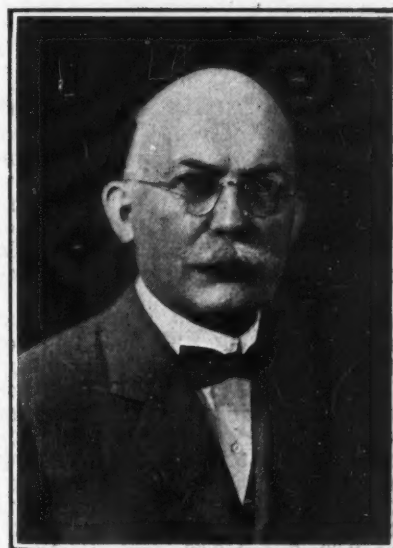
The letter of Secretary Hoover to Commissioner Johnson is in answer to an inquiry by the officials of the local coal operators' organization concerning the steps which, in the judgment of Mr. Hoover, it would be necessary for the coal operators to take to bring about a condition which would justify Congress in suspension of any legislative action. In hearings on legislative proposals for the coal industry before the House Interstate and Foreign Commerce Committee in May, Secretary Hoover stated: "If the unionized section of the bituminous industry could set up its own mediation board in the same terms as the anthracite industry, I believe Congress would be well justified in suspending any legislative action." To secure an elaboration of his views, Commissioner Johnson wrote Secretary Hoover.

This was accompanied by a note signed by Mr. Johnson, which reads:

I herewith enclose a copy of a coal statement, resulting from correspondence between the Southwestern Interstate Coal Operators' Association and the Honorable Secretary Hoover of the Department of Commerce, on the subject of a proper tribunal for voluntary arbitration, which is of vital interest to the coal industry and the public at large.

We shall be glad if you will give it the largest possible space.

The procedure followed gives rise to the belief that the Southwestern association has raised the issue with the idea of obtaining positive action in the



Charles W. Bryan

The former Governor of Nebraska, who dropped out of sight temporarily with his defeat for Vice-President on the Democratic ticket in 1924, has enlivened Nebraska's primary campaign which culminates on Aug. 10. Mr. Bryan is the only candidate for the Democratic nomination for Governor. He already is looking to the major campaign with the declaration that special interests oppose his municipal oil and coal station program and that they "are offering to debauch the people of Nebraska as they did in the recent Pennsylvania and Illinois primaries."

mediation matter. If the idea formulated in this correspondence fails to go through, either because the operators decline to lay it before the miners or because the miners reject it, it will strengthen the case of those who are urging legislation. So long as the issue had not been raised by a responsible group of operators, it could not be said that it had been rejected.

The Southwestern association is in a position, it is admitted, either to get a decision in the matter or to make it appear that the Central Competitive operators have pocket-vetoed the proposition. Then those who favor the setting up of mediation machinery by legislation will contend that the last alternative has been exhausted and that nothing remains but action by Congress.

Atlas Mine Strike in Indiana Called Off

The strike at the Atlas mine No. 1 of the Pike County Coal Co., at Petersburg, Ind., has been called off by the district officials of the United Mine Workers. About 450 miners were idle for nearly a month as a result of the strike.

The walkout was occasioned by an argument between the mine operators and the men over division of the work when the mine recently installed loading machines, cutting the working force of the mine from 450 to 200 men. The miners asked the operators for an equal division of the work on the loading machines. John Lewis, president of the United Mine Workers, was appealed to. The loading machines were installed by the operators in an effort to compete with the big stripping mines of Pike County.

EDITOR'S NOTE—The foregoing Washington letter reflects certain views of official Washington. Due to the fact that policy as a rule prevents government officials from permitting their views being quoted directly, the authority for these reports is necessarily somewhat vaguely referred to. The views reflected are not those of any one group of officials, but of different men, in the legislative and executive departments. There is no necessary connection between their views and COAL AGE editorial policy; neither do they necessarily represent Mr. Wooton's personal views. It is felt that the opinions thus faithfully reflected will be of great interest to the industry. Where opinions are cited from sources outside of the government, the source will be specifically stated.

Mine Accidents Cause 145 Fatalities in June; Six Month Total Falls

Accidents at coal mines in the United States in June, 1926, were responsible for the loss of 145 lives, according to information received from state mine inspectors by the U. S. Bureau of Mines. Of this number 105 deaths occurred in bituminous mines and 40 in anthracite mines. Based on a production of 41,992,000 tons of bituminous coal and 8,937,000 tons of anthracite, the rates per million tons of coal produced were 2.50 and 4.48 respectively, while for the industry as a whole the rate was 2.85. Based on a production of 37,167,000 tons of bituminous, 7,576,000 tons of anthracite, and 44,743,000 tons of bituminous and anthracite, the rates for June, 1925, were 2.88, 7 and 3.58, respectively.

No major disaster—that is, one causing the death of 5 or more men—was reported in June, but such disasters for 1926 to date have numbered 8 and have caused the loss of 195 lives. For the same period in 1925 there were 8 major accidents causing the death of 179 men. The per-million-ton death rate based exclusively on these major accidents for both bituminous and anthracite mines was 0.642 for 1926 and 0.641 for 1925.

During the first six months of the current year the accident record shows 1,137 fatalities; that for the corresponding period last year showed 1,148. The six months tonnage was 303,760,000 and 279,248,000 in the two years respectively. These figures indicate a fatality rate of 3.74 per million

"World Union" Organized

A new labor movement has been started in southern West Virginia with the granting of a charter to the World's United Labor of Charleston. The incorporators are Charles W. McHone, of Montgomery; G. E. Hager, W. O. Walker, D. E. Rogers and B. E. Osborne, all of Rainelle. The charter sets forth that it is organized for the purpose of "uniting labor in one union and to establish living wages in all fields of industrial activity." Apparently the movement has not spread into the non-union coal fields.

tons for the present year and 4.11 for the first six months of 1925, a reduction of 9 per cent. The six months' fatality rate for bituminous mines alone was 3.61 per million tons, with a production of 267,506,000 tons, as compared with 3.67 and an output of 234,886,000 tons in the same period of 1925. The anthracite rate was 4.69 and 6.42 respectively, based on output of 36,254,000 and 44,362,000 tons.

An examination of the principal causes of accidents reported thus far in 1926 and a comparison of the records with that for January to June, 1925, shows a decrease in all of the rates.

	Year 1925	Jan. to June 1925	1926
All causes.....	3.811	4.111	3.743
Falls of roof and coal.....	1.842	1.815	1.781
Haulage.....	.615	.691	.622
Gas or dust explosions.....	.590	.809	.764
Explosives.....	.174	.200	.138
Electricity.....	.144	.129	.105

New Statewide Association Gets Under Way in Ohio

Organization work in the newly formed Ohio Coal Operators' Association, Inc., which was launched at a meeting held in Columbus July 13 and 14, is progressing satisfactorily according to Assistant Secretary George K. Smith.

The association will hold a meeting in Columbus Aug. 10, when organization affairs will be settled up and the various committees will be named. The attitude of the association toward labor in the mines will be determined at that time. This question will be one of the most important to be taken up at the coming meeting and one over which there are some differences of opinion among the producers.

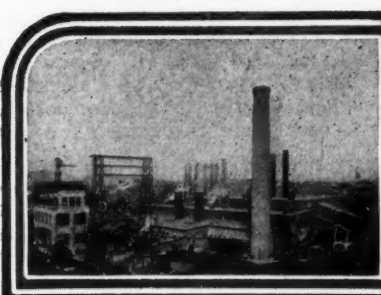
Operators throughout the state, including both those who attended the preliminary meeting and others who were not represented, are subscribing for the stock issue. The charter provides for 500 shares of stock, with no par value designated, which is to be sold to the members of the association at \$50 per share.

Reports received from various producing fields in Ohio show that operators are interested in the new organization and believe that the salvation of the Ohio coal trade can be brought about only through some strong central association. This association has now been supplied and operators are flocking in to become affiliated and lend a helping hand to retrieve the industry in Ohio.

Coal-Mine Fatalities During June, 1926, by Causes and States

(Compiled by Bureau of Mines and Published by Coal Age)

State	Underground											Shaft				Surface						Total by States				
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Explosion of gas or coal dust.	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1926	1925
Alabama.....	5		3	4	...		1					13													13	4
Alaska.....																									0	0
Arkansas.....																									0	0
Colorado.....																									7	4
Illinois.....	1				1							3													3	4
Indiana.....	2		1									3													3	1
Iowa.....																									2	0
Kansas.....																									0	0
Kentucky.....	2		2									4													4	29
Maryland.....			2				1					3													3	0
Michigan.....																									0	0
Missouri.....																									0	1
Montana.....																									0	0
New Mexico.....	1		1									2													2	2
North Dakota.....																									0	0
Ohio.....	1		1		2		1					5													5	4
Oklahoma.....																									0	0
Pennsylvania (bituminous).....	10	1	2	1	1		2		1			18													18	14
South Dakota.....																									0	0
Tennessee.....	1				1							2													2	2
Texas.....																									0	0
Utah.....	1		1									2													2	2
Virginia.....	3											3													3	4
Washington.....																									0	1
West Virginia.....	28	2	7		1		2		2			42							1						43	26
Wyoming.....	1	1		2								4													4	3
Total (bituminous).....	56	4	20	7	6		7		3			104						1	1						105	107
Pennsylvania (anthracite).....	15	4	4	2	5	1		1				36									2	1			40	53
Total June, 1926.....	71	8	24	9	11	1	7	1	3		5	140						1	2			2	5		145	
Total June, 1925.....	59	10	32	26	8		5				4	144	2			1	3	2	3			1	7	13		109



News Items From Field and Trade



ALABAMA

Stith Equipment Going In.—Hoisting equipment and headframes are now being installed in the new shaft of the Stith Coal Co. at Bon Air, near Americus, Walker County. The output from this shaft will be handled over the same tippie used by the several drift mines at this point.

Houses and Church for Miners.—A number of additional dwellings for employees and a church building are under construction by the Black Creek Coal & Coke Co. at its Thermal mine, at Trafford, Jefferson County.

The supply house at Holt, belonging to the Central Iron & Coal Co., of Tuscaloosa, was damaged by fire recently with a loss of about \$50,000.

Renew Option on 20,000 Acres.—The Warrior View Coal Co., Birmingham, of which Frank C. Lewis is president, is reported to have obtained a three-months renewal option on 20,000 acres of coal lands in the Hurricane Creek bend on the Warrior River, Tuscaloosa County, which the company is considering buying for development. The company now operates the Warrior View mine in the same locality.

ARKANSAS

To Resume Mining at Bates.—Indications that coal mining, which has been stopped at Bates for the past four years, might be resumed became known with the purchase of 720 acres of coal land from the Bates Smokeless Coal Co. by J. B. Henson and associates. The same organization has leased 1,800 acres belonging to the Warner Coal Co., north of Bates. It is reported that Old No. 2 mine a mile east of Bates, will be cleaned and opened by W. J. Francis, present operator of small mines there. The mines have been closed since 1921 and it said they will be operated under the 1917 wage scale.

ILLINOIS

Carbon Mine Works Steadily.—An unusual record in Southern Illinois for mine operation has just been completed by the Carbon mine of the West Virginia Coal Corporation, near O'Fallon. During the fiscal year which closed on June 30 the shaft operated 245 days out of a possible 300, an average of just a fraction under five days per week. The Taylor mine of the same company was in operation 214 days during the year, or slightly more than four days per week. Recently James Mason, secretary-treasurer of Subdistrict No. 7 of District No. 12, in which these mines are

located, reported that thirty-two mines in the district were idle and approximately 3,200 miners out of work.

Exams for Mine Officials.—The state Mining Board will meet in the State House, Springfield, Aug. 9 to examine candidates for certificates as mine managers, first and second class; hoisting engineers, mine examiners and electrical hoisting engineers. The mining board is composed of A. D. Lewis, M. S. Coleman, James Needham, Francis M. Devlin and S. E. Redpath.

June Output Tops Year Ago.—Illinois coal mines produced 4,044,135 tons during June, the report of A. D. Lewis, director of the Department of Mines and Minerals, reveals. Shaft mines produced 3,768,898 tons and strip mines 275,237 tons. In June, 1925, the mines of the state produced 3,809,357 tons. The figures were based on reports from 147 mines employing 45,161 workers. The mines averaged 13.5 days during the month. But three mine workers were killed during the month. For the four months ending with June the mines of the state produced 18,130,831 tons against 16,237,513 tons for the same period in 1925.

For the first time in almost five months all of the operating mines in the Herrin district are again working. Railroads report a 25-per cent increase in coal tonnage during the past ten days. A further increase is anticipated.

INDIANA

Big Four Reforesting Strip Land.—A reforestation program has been launched by the Big Four railroad in Pike County, Ind., whereby several thousand acres of land stripped of coal and left in an uneven and a disheveled state, will be reclaimed. The area is being worked by the Enos Coal Mining Co., of Cleveland, which is stripping the land and mining the coal near the surface. The Big Four company commenced its program of reforestation in the spring by planting 2,000 trees. This is just the beginning of the work, it is said.

Officials of the Winslow Mining Co., Winslow, Ind., have filed a certificate showing the final dissolution of the corporation.

The Stock coal mine at Chandler is undergoing repairs now and new screens are being installed. The mine is a short distance from the Evansville Suburban and Newburgh traction line and Mr. Stock is making arrangements to extend a switch to his mine from this railroad. Heretofore wagons have hauled the coal the short distance from the mine to the traction line.

KANSAS

Purchase of 862 acres of coal land in Crawford and Bourbon counties has been announced by John G. Miller, president of the Midwest State Bank and of several other banks in South-eastern Kansas. The purchase brings the total proved coal lands held by Miller and his associates to 17,000 acres. He said development of the newly acquired land would start at once.

KENTUCKY

Miners Earn \$7.39 to \$9.42 a Day.—One of the Bell County mines, in advertising for labor, recently issued a statement showing that men earned, above powder costs, an average of \$7.39 to \$9.42 a day during June and the first part of July, when the mines were running but eighteen to twenty days a month.

Jerry M. Moran, formerly sales manager for the Harlan Coal Co. and for more than a year with the Downard Mining & Sales Co., on Aug. 1 became sales manager of the Southwestern Fuel Co., sales agent for the Black Diamond Mining Co., Drakesboro. Both concerns are headed by W. W. Bridges. Moran a few years ago was a professional baseball player in the Southern League, went to Lynch to play on the team of the United States Coal & Coke Co. and held down an office job, where he obtained his first coal experience.

The Chavies Coal Co., organized recently at Chavies, below Whitesburg, in Perry County, by J. C. Johnson, W. Z. Johnson and others, will launch a new operation at Chavies, where new mines are to be opened up. It is also said the company will also take over other old mines.

From Pineville it is reported that a concrete underpass costing \$60,000 is being built to connect with the properties of the Wallsend Coal Co. and that arrangements will be made to establish a railroad engine loading station for the Louisville & Nashville R.R., on the property. It is also reported that a retail coal department will be established.

The Louisville & Nashville R.R. has been authorized by the Interstate Commerce Commission to acquire by purchase of capital stock and lease of the Cumberland & Manchester R.R., a short line in eastern Kentucky.

The Interstate Commerce Commission has authorized purchase by the Artemus-Jellico R.R. of the Cumberland R.R. in Knox County, which extends from Artemus, on the Louisville & Nashville R.R., to Anchor. The Arte-

mus Jellico Railroad Co. will issue stock to pay for property needed, and plans to develop and move 200,000 tons of coal annually for the next five years. The line is 12.9 miles long.

The C. L. Ryley Coal Co., Lexington owning and operating five mines, of which two have been purchased in less than a year, has filed amended articles increasing its capital stock from \$500,000 to \$650,000.

Illinois Capital Active in Kentucky.—It is reported that Illinois capital is behind a new coal company which is sinking a new coal mine shaft at Corydon, on the Illinois Central R. R. near Henderson. Isaac Watts is manager.

MINNESOTA

More Zenith Coke Ovens.—The Zenith Furnace Co. is increasing coke-oven facilities in preparation for a larger output of domestic coke next fall and winter. Contractors are still engaged in rebuilding ovens that were destroyed in the fire at the plant last winter.

Bids have been opened for 30,000 tons of screenings required by the town of Hibbing for heating its municipal buildings and schools. The contract is expected to be awarded soon.

The Minneapolis Board of Education has awarded contracts for furnishing fuel to the city schools to the Reeves Coal Co. The bid included 1,720 tons of Eastern bituminous, \$6.75; 1,910 tons smokeless mine-run, \$6.75; 1,440 tons splint screenings, \$5.95; 6,275 tons free-burning bituminous, \$42.355.

NEW YORK

G. W. Seiler, president of the Seiler Coal Co., New York City, announced last week the sale of the unexpired portion of the contract for the sale of the product of the Pine Hill Collieries Co., to take effect August 1. The sale of these coals will be handled hereafter by Weston Dodson Co., also of New York. The Seiler Coal Co. will continue to handle the other well-known hard and soft coals which it has sold for the past several years.

Madeira, Hill & Co. has increased its sales force by the appointment of Val G. Hall as its representative in upper Manhattan, Bronx and Westchester County, effective Aug. 1. Mr. Hall formerly was associated with the Phoenix Coal Co., of New York City.

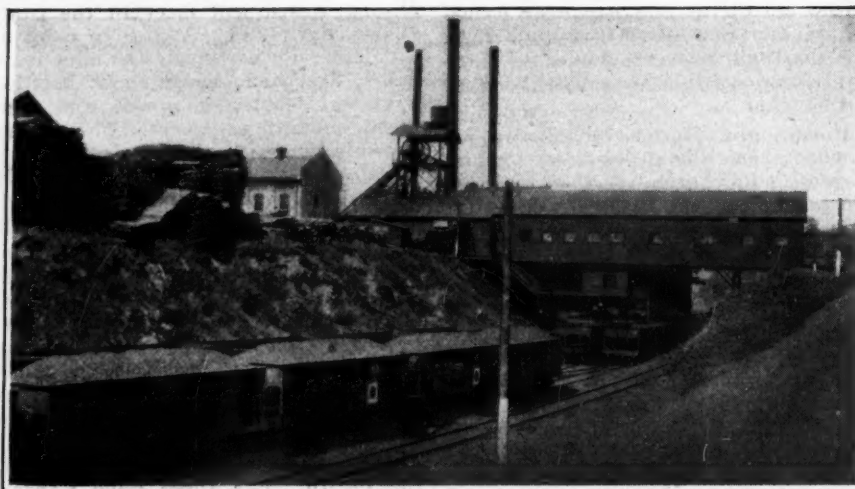
OHIO

Goodyear Mine Closes Indefinitely.—The Dunkenwood mine of the Wheeling Township Coal Mining Co. has suspended operations owing to the high cost of producing, causing about 400 miners to be laid off. The mine is controlled by the Goodyear interests and has a daily capacity of 1,800 tons. The suspension as announced is indefinite.

The Columbus Board of Purchase will receive bids Aug. 12 for 12,000 tons of 2-in. nut, pea and slack for the municipal light plant; 7,000 tons of the same grades for the Water Works Department; 1,800 tons of 2-in. nut, pea and slack and 1,200 tons of 1-in. West Virginia nut, pea and slack for the

garbage-reduction plant. H. C. Cain is secretary of the board.

Thomas Holdings Sold.—The holdings of David Thomas, consisting of 1,200 acre of coal land at Naugatuck, have been purchased by Columbus (Ohio) interests and a corporation known as the David Thomas Coal Co. has been chartered to operate the mines. S. F. L. Dean has been elected president; Frank E. Kramer, vice-president, and W. S. Crater, secretary and treasurer. The consideration was \$300,000. The property contains two seams of coal, one of which is being worked. Improvements consist of a tippie, power plant and a large number of miners' homes.



Ocean No. 1 Mine, Herminie, Westmoreland County, Pennsylvania

One of the two mines of the Ocean Coal Co., a subsidiary of the Berwind-White Coal Mining Co. These mines have been carefully rock-dusted, the costs and results being described in *Coal Age*, July 8.

PENNSYLVANIA

Improvements for Scranton Coal Co.—The Scranton Coal Co. is taking full title to lands from which it has been removing anthracite under lease for many years. A mortgage for \$3,000,000 given by the company to the Hanover National Bank of New York was filed at the Scranton Lackawanna court house last week. This mortgage is to guarantee payment of a gold note issue bearing interest at the rate of 7 per cent and is to mature in 1936. A total of \$300,000 in notes will be redeemed annually. The same bank recently took over a mortgage for \$1,600,000 given by the Elk Hill Coal & Iron Co. to the Scranton Coal Co. The Scranton company will use some of the mortgage money for improvements to operations. Chief among these will be the driving of a tunnel from the Mount Pleasant mine to the Pine Brook mine in the North Scranton section. All coal from the Mount Pleasant will be hauled underground to the Pine Brook breaker for preparation upon the completion of the tunnel.

Hard-Coal Tax Total Declines.—There will be a falling off of about one-third in the amount of anthracite tax payments this year. "The coal strike of last year is reflected in a very marked degree," said Samuel S. Lewis, State Treasurer, "in the tax return for 1925. For six of the larger coal com-

panies that paid an aggregate of \$1,556,788.93 for 1924 the amount for 1925 will be \$1,079,997.34. Upon this basis there will probably be a decrease in this year's return of approximately 33½ per cent from the return for last year."

Tax Settlement in Sight.—A settlement of the City of Scranton's dispute with local coal companies over the 1924 increase in the coal tax assessment, which has delayed payment of more than \$350,000 in taxes, is believed to be in sight. Valuation experts retained by the city some time ago are to report soon. City Solicitor C. B. Little and Attorney J. Hayden Oliver, counsel for the Glen Alden Coal Co., are ar-

ranging for a court hearing of the case. The Board of City Assessors, under Chairman John H. Jordan, in 1924 boosted the coal land valuation from \$320 to \$800 per foot-acre. After appealing the assessment, the coal companies paid taxes on a \$200 valuation.

Oppose Coal Land as Playground.—Scranton city mine-cave engineers have advised the City Council against leasing a tract of land in the West Scranton section for use as a playground. The engineers, William Ross and Fred K. Derby, reported that it will require two years for the Glen Alden Coal Co. to remove all of the coal now being mined under the particular section.

The Pittsburgh Terminal Coal Corp. is installing 800 new mine cars of 3 tons capacity each in its No. 8 mine, at Coverdale. The old cars, of 2 ton capacity, will be assigned to Mines Nos. 3 and 4.

Soudan Mine to Run Open Shop.—Reports were current last week that the Soudan mine of the Valley Camp Coal Co., at VanVoorhis, which ceased operation several days ago, would reopen soon on an open-shop basis. At the time of closing the mine was one of the few in that section of the Monongahela valley operating in accordance with the Jacksonville wage pact.

Deficit Shrinks.—The Pennsylvania Coal & Coke Co. and subsidiaries report for the quarter ended June 30, 1926, a

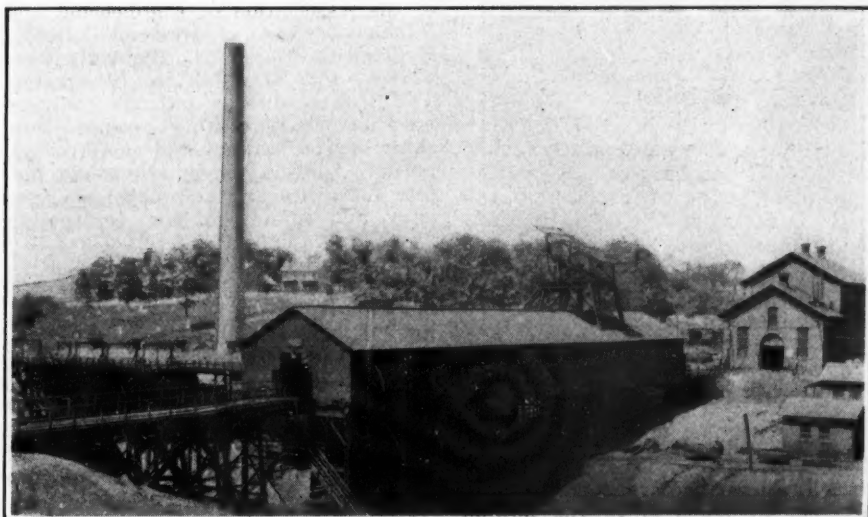
deficit of \$174,932, after ordinary taxes, depreciation and depletion but before federal taxes, against deficit of \$190,408 in the June quarter of 1925. Deficit for June was \$55,669, compared with \$66,341 in June, 1925. The deficit for the first six months totaled \$195,137, against \$349,093 in the first half of the previous year.

A movement is reported to be afoot in the Connellsville coke region to merge several individual coal and coke plants. The combined value of the plants under consideration by the interests active in promoting the proposed consolidation is between \$6,000,000 and \$7,000,000.

The Reynoldsville coke ovens, which have been idle for two years, are to be scrapped.

WEST VIRGINIA

Third Paisley Mine Reopens.—Triadelphia mine No. 2 of the Elm Grove Mining Co., owned by the Paisley interests of Cleveland, will resume operations this week with 600 men, according to an announcement by Joseph Arkwright, general superintendent. About 800 men are employed at the two mines at which operations were resumed some time ago on a non-union basis. The company formerly operated its mines under an agreement with the union, but broke with the union after a disagreement as to the manner of paying wages. It is also announced that the fourth mine owned by the company where about 400 men are normally employed will be reopened about Sept. 1.



Ocean No. 2 Mine at Herminie, on Pennsylvania Branch Along Little Sewickley Creek, South of Irwin, Pa.

One of two mines of the Ocean Coal Co. This illustration shows the shaft of the boiler house. In this plant are nine boilers having a total capacity of 2,000 hp. and a generating capacity of 1,200 kw. at 500 volts direct current. Ocean Mines Nos. 1 and 2 have twenty-eight electric locomotives.

TENNESSEE

Cave-In Wrecks Transfer Plant.—The West Kentucky Coal Co., Sturgis, Ky., suffered a heavy loss at Memphis on July 25, when its big coal yards, elevators, river coal-handling equipment, etc., for transferring coal from river to rail, were wrecked by a sudden shifting of the earth, causing the property to sink 50 ft. or more, twisting and wrecking equipment, breaking rails, and leaving the property a wreck. The cave-in was 1,000 ft. long and 200 ft. wide.

The Zion Coal Co., Nashville, has let a contract for the rebuilding of its tipple.

UTAH

The Bamberger Coal Co., one of the largest and best known retail coal companies of Salt Lake City, has been taken over by the Utah Fuel Co. So far the name has not been changed, but it is understood it will be soon. W. H. Alder is to remain as manager.

The Royal Coal Co., of Salt Lake City, a Rolapp concern, has been granted permission to sell \$400,000 of first premium cumulative stock at par.

The Pittsburgh Coal & Land Co. Inc., a West Virginia corporation, with its chief offices in Pittsburgh, Pa., has filed a certificate in the office of the Secretary of State at Charleston, in which a change in the issuance of shares of stock is covered. The preferred stock is increased from 1,000 shares at \$100 par to 5,000 shares at \$100 par, while the common stock has been increased from 1,500 shares of no par value to 7,000 shares of no par value. Howard N. Eavenson, of Pittsburgh, Pa., is president of the company.

Super Fuel Co., of Wheeling, with offices at Moundsville, has filed a certificate of dissolution.

Official announcement has been made at Wheeling that the property of the Richland Coal Co., now in the hands of a receiver, will be sold at public auction Aug. 4 and 5, in Ohio and Brooke counties, for non-payment of taxes.

Plan Byproduct Plant at Hoard.—Semi-official announcement has been made that a byproduct plant costing approximately \$8,000,000 when completed and employing 3,500 workmen when in full operation will be constructed by the Coal Products & Carbide Co., of Boston,

Mass., at Hoard, on the line of the Baltimore & Ohio R.R. and on the Monongahela River, near Morgantown. Carbide will be one of the important products manufactured and it is also understood that artificial gas will also be an important product. Certain details in connection with the location of the plant are still to be worked out. It is proposed, according to the best information obtainable, to build the plant in units of three furnaces each.

Car Loadings Break N. & W. Record.—A record for coal-car loadings was established by the Norfolk & Western Ry. during the week ending July 24, with a total of 18,868 cars. The previous record was 18,858 cars, set in December, 1925. All of the coal loaded was bituminous, with the exception of 106 cars from the semi-anthracite field of the Radford division.

Move for Chafin Pardon.—What is believed to be an important step toward obtaining a pardon for Don Chafin, formerly sheriff of Logan County, who stopped the miners' march and prevented Logan County from being unionized several years ago, and who is now serving a two-year sentence in the federal penitentiary, was begun in federal court in Charleston, on July 27, when U. S. Attorney Elliott Northcott, of Huntington, made a motion to *nolle-pros* one of the pending charges. Chafin was convicted for conspiracy to violate the prohibition act. Judge George W. McClintic certified the motion to the Circuit Court for the appointment of another judge to act on the motion, because of a certificate of prejudice filed at the time of Chafin's trial.

Operators' Associations to Merge.—A meeting of the New River and Winding Gulf Coal Operators' associations will be held at the White Oak Country Club, near Beckley, on Aug. 11. It is reported that at the meeting a proposal will be made to merge the two organizations into one to be known as the New River-Winding Gulf Operators' Association. It is contended that the interests of the operators of Fayette, Raleigh and Wyoming counties are quite similar. The two fields now produce 25,000,000 tons of smokeless coal and according to reports jointly exceed the output of the Pocahontas and Tug River fields.

CANADA

Adopt Remedy for Bumps.—A modification of the longwall system is to be adopted at the Springhill (N. S.) collieries, in accordance with a suggestion from Mr. Harrington, Provincial Minister of Mines, who is anxious for the adoption of new methods in order to effect a solution of the bump problem. Mining men are keenly interested in the finding of a remedy for the bump situation, and are keen to learn to what extent longwall has succeeded.

Coke production in Canada during June totaled 151,564 tons, as compared with 159,390 tons in May, and 109,694 tons in June of last year. Imports of coke into Canada for the month were 89,632 tons, as against 66,572 tons in May, while exports amounted to 5,250 tons, compared with 4,973 tons in May.

Among the Coal Men

Frederick E. Bedale, of Greensburg, Pa., has been appointed by Governor Pinchot of Pennsylvania as manager of the State Workmen's Compensation Insurance Fund succeeding Gabriel H. Moyer, of Lebanon, who resigned a month ago. The new manager is a graduate of the State College School of Mines of the class of 1909, and prior to taking charge of the coal-mine section of the State Workmen's Insurance Fund in 1917, he was a mine insurance inspector with the Associated Companies. For some years Mr. Bedale has represented the State Fund on the executive committee of the Pennsylvania Compensation Rating and Inspection Bureau.

Scott Turner, director of the U. S. Bureau of Mines, spent three days recently in an inspection of the various departments of the Pittsburgh station of the Bureau. He spent two days in the various offices and laboratories in Pittsburgh and one day at the experimental mine at Bruceton, Pa., getting acquainted with the research work of this branch and the men who conduct it. This was his first official visit to Pittsburgh since his appointment, Jan. 1.

Cecil W. Smith has been appointed assistant general manager of the O'Gara Coal Co., with headquarters in Chicago, effective July 15. Mr. Smith is a graduate mining engineer of the class of 1913, University of Illinois. During his summer vacations he was employed by the U. S. Geological Survey. After graduating from the university he was employed by the Nokomis Coal Co. and assisted in the laying out of that property at the time it was built, later going with the H. C. Frick Coke Corporation as an engineer at Scottdale, Pa. Since 1918 he has been chief engineer of the Illinois Coal Corporation.

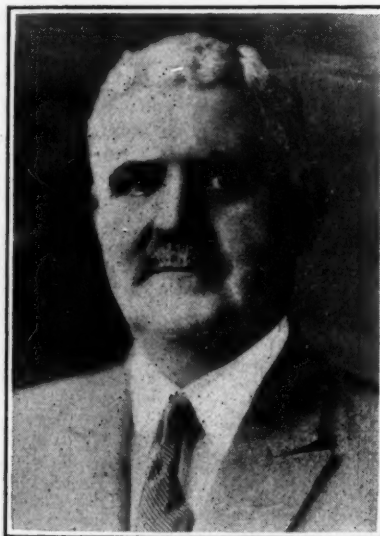
Col. James Elwood Jones, vice-president of the Pocahontas Fuel Co., Pocahontas, Va., has intimated that he may be a candidate to succeed himself as a member of the County Court of McDowell County, West Virginia.

Wayne P. Ellis, newly named Northwestern sales agent for the Berwind Fuel Co., with headquarters in Minneapolis, Minn., has discontinued the Ellis Coal Bureau.

Count Nikolaus Ballestrem, of Czeronowitz, Germany, was a visitor in Fairmont, W. Va., recently as the guest of Howard M. Showalter, president of the Continental Coal Co., who took the Count on a tour through the coal mines of the company and pointed out the American methods of mining coal. Count Ballestrem is one of the leading coal operators of Germany, being interested financially in several large mines in Upper Silesia. He was shown through the Sands mine at Rivesville and the Brock mine at Cassville, two of the most modern plants in the region.

Lord Castleleagh, son of the Marquis of Londonderry, recently was person-

ally conducted through the Fairmont (W. Va.) coal field by Howard M. Showalter, president of the Continental Coal Co. Lord Castleleagh was high in his praise of the local coal lands and American coal mining methods.



Michael Gallagher

R. L. Ireland, Jr., grandson of the late U. S. Senator Mark Hanna, has been appointed to succeed **Michael Gallagher** as manager of the bituminous coal mining department of M. A. Hanna & Co., with offices in Cleveland, Ohio. The appointment became effective Aug. 1, when Mr. Gallagher joined the Van Sweringen railroad interests.

P. A. Fernsler has been appointed superintendent of the coke works of the Pittsburgh Crucible Steel Co., Midland, Pa. He succeeds **John W. Hacker**, who resigned recently to supervise the construction of the new byproduct coke plant of the Central Steel Co., Massillon, Ohio, of which he will become superintendent upon its completion.

E. G. McFarland, assistant to **Charles F. Ingold**, vice-president and sales manager of the Bertha-Consumers Co., Pittsburgh, Pa., has been appointed sales agent for the company in western Pennsylvania.

William A. Glasgow, Jr., and **A. S. Olmstead, 2d**, have been retained as counsel by several Philadelphia business organizations to defend the interests of that city at future coal rate hearings. These well-known legal lights will represent the Maritime Exchange, the Chamber of Commerce, the Ocean Traffic Bureau, the Board of Trade, the Bourse, the Commercial Exchange, the Manufacturers' Club and the Commercial Traffic Managers' Association.

John D. Moody, of Republic, Fayette Co., Pa., has resigned as superintendent of Thompson No. 2 mine of the Hillman Coal & Coke Co. near that place. Mr. Moody has held this position for seven years.

Publications Received

The Coal Pocket Book—Bituminous, by **Wightman D. Roberts**, Huntington, W. Va. pp. 17; 6x9 in.; illustrated. Price \$1. Discusses what is good and what is bad coal, ash content, costs, moisture and oxygen in coal; use of volatile matter. Table showing the carbon and volatile of the standard high-volatile coals, also fuel values of coal and oil are included.

Chemical Engineering and Chemical Catalogue, by **Leonard Hill**, London, England. Compiled with the co-operation of leading British manufacturers. Second edition. Pp. 360; 7½x9½ in.; illustrated. Price, 15s.

Compressed Air and Its Machinery, By **Dr. T. H. Plummer**. Technical series of the Association of Engineering and Shipbuilding Draughtsmen, London, England. Price, 10s. (equivalent to \$2.50). Pp. 221, 6x9 in.; illustrated. The book is divided into six chapters covering reciprocating compressors, rotary turbo blowers and compressors, positive blowers; pneumatic tools; meters for gases and air; physics, chemistry and mining of air (extracting gases from the atmosphere.)

Practical Coal Production—Getting Out the Coal, by **Frank H. Kneeland**, McGraw-Hill Book Co., New York City. Pp. 403, 5½x8 in.; illustrated. Price, \$3. This is the second volume in a series of three—each complete in itself—on coal production. Detailed treatment is given to methods of getting coal out of the mine. Only methods which have been put to practical and successful use are included.

Geology and Mineral Resources of the Joliet Quadrangle, by **D. J. Fisher**. Department of Registration and Education, Division of the State Geological Survey, Urbana, Ill. Bulletin No. 51. Pp. 160; 6½x9½ in.; illustrated.

The Glenwood Beds as a Horizon Market at the Base of the Platteville Formation, by **Arthur Bevan**. Department of Registration and Education, Division of the State Geological Survey, Urbana, Ill. Report of Investigation No. 9. Pp. 13; 6½x9½ in.; illustrated.

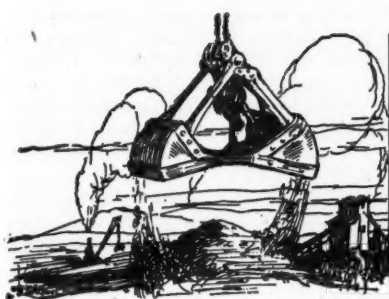
Metal Statistics. American Metal Market, New York City. Pp. 544; 4x6 in. Prices, \$1. Contains statistics on practically every phase of the iron, steel and metal industries.

Preliminary Report on the Economic Mineral Resources of Calhoun County, by **J. E. Lamar**. Department of Registration and Education, Division of the State Geological Survey, Urbana, Ill. Pp. 21; 6½x9½ in.; illustrated.

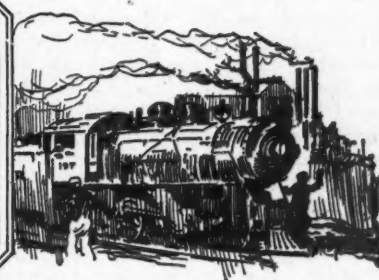
Power-Factor Wastes, by **Charles R. Underhill**. McGraw-Hill Book Co., New York City. Pp. 326; 6x9-in.; illustrated. Price, \$3.50. A complete and practical discussion of power-factor wastes, their costs, causes and cures.

Geology Applied to Mining — New Second Edition, by **J. E. Spurr**. McGraw-Hill Book Co., New York City. Pp. 361, pocket size, illustrated. Price, \$3. The book presents a plain, simple, straightforward application of the principles of economic geology to mining problems.

A Graduate Course in Fuel and Gas Engineering. Massachusetts Institute of Technology, Cambridge, Mass.



Production And the Market



Bituminous-Coal Market Registers Further Gains; Export Movement Soars

The bituminous coal markets of the country continued to reflect a modest increase of momentum in demand last week. A further increase in production took place on the heels of the quick rebound from the holiday dip. Foreign shipments and lake loadings, as usual, are a conspicuous feature of current demand, but a broadening of the trade in domestic grades in the Middle West and at the Head of the Lakes is becoming increasingly evident. Prices, while failing to show any striking gains during the past week, acquired a gratifying degree of firmness.

Production during the week ended July 24 is estimated by the U. S. Bureau of Mines at 10,162,000 net tons, a gain of 46,000 tons over the revised figures for the preceding week.

Export Movement Hits High Spots

Although predictions of the early collapse of the export trade are still heard from time to time the tonnage being shipped continues to mount. Dumpings at Hampton Roads during the week ended July 29 reached the unprecedented figure of 806,569 net tons. Total tonnage for the month was 2,755,556, which exceeds the previous record, made in June, 1921, by 483,556 tons. All three piers surpassed their old records. While most of this coal was for shipment to the United Kingdom, the movement to Italy, South America and other countries was heavy. Foreign trade continues to climb at Baltimore also.

The lake trade is holding its own in good style. During the week ended August 1 dumpings at Lake Erie ports were 983,988 tons of cargo and 56,805 tons of vessel fuel. This brings the season's total to 14,692,263 tons, compared with 12,400,319 tons at the same time last year.

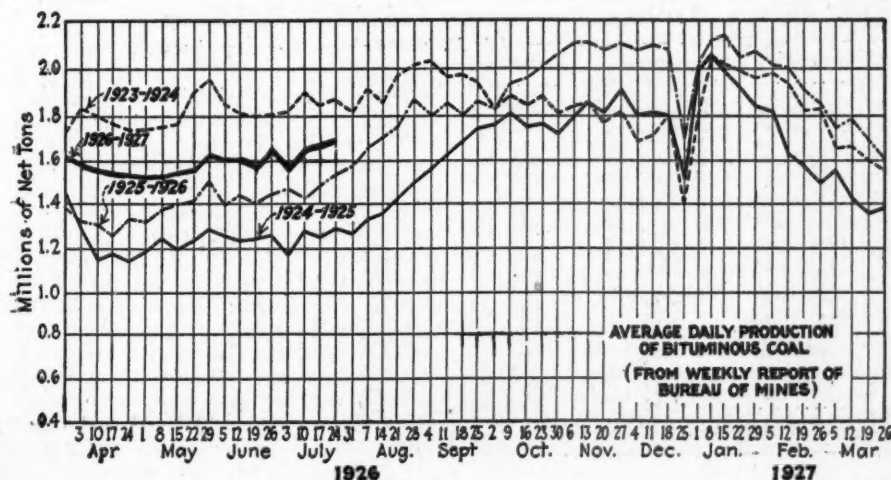
Coal Age Index of spot bituminous prices registered no appreciable change during the week, standing on Aug. 2 at 159, the corresponding price for which is \$1.92. There was a fractional advance, but not large enough to effect a change from the figure of the preceding week.

Confidence in the future is shown by advances in domestic circular prices for August in most of the Mid-western fields, some producers refusing to name figures for beyond the middle of the month. West Virginia smokeless also jumped. Screenings are a shade easier all around. While the situation in steam coals displays less marked evidence of improvement, industrial conditions, as reflected in continued heavy freight loadings and increasing coal consumption by industrial plants, give a sound basis for the cheerful view of the more optimistic element in the trade. The Eastern markets are lacking in noteworthy features.

Hard-Coal Situation Firmer

A firmer note is discernible in the anthracite situation. Current demand is not notably stronger, but the beginning of fall demand is just around the corner and the scaling down of output through curtailment of operations by the producers has had a steadying influence on the prices of independent coals. All the domestic sizes are stronger and even the steam grades are moving with greater freedom. Output during the week ended July 24 was 1,940,000 net tons, compared with 1,999,000 tons a year ago.

The Connellsville coke trade experienced a further stiffening last week, spot furnace coke advancing to \$2.85@\$. Spot foundry was quothably unchanged, but sales averaged somewhat higher within the prevailing price range.



Estimates of Production

(Net Tons)
BITUMINOUS

	1925	1926
July 10.....	8,639,000	8,306,000
July 17 (a).....	8,965,000	10,116,000
July 24 (b).....	9,343,000	10,162,000
Daily average.....	1,557,000	1,694,000
Cal. yr. to date..... (c)	263,954,000	300,449,000
Daily av. to date.....	1,524,000	1,734,000

ANTHRACITE

July 10.....	1,809,000	1,545,000
July 17.....	1,936,000	1,979,000
July 24.....	1,999,000	1,940,000
Cal. yr. to date..... (c)	50,472,000	42,616,000

BEEHIVE COKE

July 17 (a).....	127,000	182,000
July 24 (b).....	124,000	170,000
Cal. yr. to date..... (c)	5,688,000	7,230,000

(a) Revised since last report. (b) Subject to revision. (c) Adjusted to equalize number of days in the two years.

Trade Picks Up in Middle West

Demand in the Middle West for Illinois, Indiana and western Kentucky domestic coals has picked up during the last few days. Prices as of Aug. 1 have been advanced in practically all the Midwest fields and smokeless is to be \$3.25. There is not much strength in high-volatile coals.

The steam-coal situation in the Chicago district has improved to some extent and prices have strengthened materially. As the industrial situation throughout the Middle West seems to be fairly good, it is expected that quotations will remain at their present level, or perhaps advance slightly.

Working time is better at a few mines in the southern Illinois field. Railroad tonnage continues light excepting at the strip mines, which are working full time and apparently finding a ready market for their coal. Very little coal is being crushed.

Duquoin and Jackson County mines are working two to three days a week

and "no bills" are plentiful. Strip mines in this field are doing unusually well. In the Mt. Olive district railroad coal continues to make business worth while, although there is a light movement of domestic coal.

In the Standard field conditions are unusually bad and there is no sign of improvement inasmuch as western Kentucky coal is going into St. Louis, which is the principal market for Standard coal, at equal and sometimes lower prices for larger and better prepared coal.

In St. Louis there is a little activity in orders for schools and apartment houses and a little storage.

Outlook Improves in Kentucky

Kentucky producers note a marked improvement in the movement of domestic coals in the past ten days and steam demand continues quite good. Some steam buyers who were backward about closing contracts in the spring are reported to have signed up recently

at 90c. @ \$1 for screenings. Quotations were higher last week for August delivery and some firms refused to quote for mid-August, when prices are expected to be higher. Eastern Kentucky screenings are a shade weaker at 90c., though some fine gas and byproduct grades bring \$1.15.

Eastern Kentucky block of off grade has been offered as low as \$2, but good grades are \$2.25 @ \$2.50, with specialty coals at \$2.75 @ \$3. Lump, egg and nut are now \$1.75 @ \$2, though some quotations a week ago were as high as \$2.25. Mine-run is steady at \$1.40 @ \$1.75.

In western Kentucky prices are fairly steady, some small nut being lower at \$1.20 and up to about block prices for large nut sizes, of high quality. Screenings are 80 @ 90c. Some fancy block is \$2.

Broader Demand at Head of Lakes

Demand for coal from docks at the Head of the Lakes shows a broadening tendency as industrial consumers are

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Aug. 3 1925	July 19 1926	July 26 1926	Aug. 2 1926†	Midwest		Market Quoted	Aug. 3 1925	July 19 1926	July 26 1926	Aug. 2 1926†
Smokeless lump.....	Columbus....		\$2.85	\$3.10	\$3.10	\$3.25 @ \$3.50	Franklin, Ill. lump.....	Chicago.....	\$2.85	\$2.75	\$2.75	\$2.75	
Smokeless mine run.....	Columbus....		1.85	2.10	2.10	2.00 @ 2.30	Franklin, Ill. mine run.....	Chicago.....	2.35	2.35	2.35	2.25 @ 2.50	
Smokeless screenings.....	Columbus....		1.35	1.30	1.25	1.25 @ 1.40	Franklin, Ill. screenings.....	Chicago.....	2.00	1.80	1.80	1.65 @ 2.00	
Smokeless lump.....	Chicago.....		3.25	3.00	3.10	3.00 @ 3.25	Central, Ill. lump.....	Chicago.....	2.60	2.40	2.40	2.35 @ 2.50	
Smokeless mine run.....	Chicago.....		2.00	1.90	1.90	1.85 @ 2.00	Central, Ill. mine run.....	Chicago.....	2.10	2.10	2.10	2.00 @ 2.25	
Smokeless lump.....	Cincinnati.....		3.00	3.10	3.10	3.25 @ 3.50	Central, Ill. screenings.....	Chicago.....	1.70	1.50	1.50	1.40 @ 1.60	
Smokeless mine run.....	Cincinnati.....		2.00	2.00	2.00	2.00	Ind. 4th Vein lump.....	Chicago.....	2.85	2.40	2.60	2.50 @ 2.75	
Smokeless screenings.....	Cincinnati.....		1.30	1.35	1.35	1.25 @ 1.50	Ind. 4th Vein mine run.....	Chicago.....	2.35	2.15	2.15	2.10 @ 2.25	
*Smokeless mine run.....	Boston.....		4.40	4.35	4.60	4.60 @ 4.75	Ind. 4th Vein screenings.....	Chicago.....	1.80	1.75	1.75	1.65 @ 1.85	
Clearfield mine run.....	Boston.....		1.75	1.75	1.75	1.65 @ 1.90	Ind. 5th Vein lump.....	Chicago.....	2.35	2.15	2.35	2.25 @ 2.50	
Cambria mine run.....	Boston.....		1.95	2.00	2.00	1.75 @ 2.00	Ind. 5th Vein mine run.....	Chicago.....	1.95	1.95	1.95	1.85 @ 2.10	
Somerset mine run.....	Boston.....		1.85	1.85	1.85	1.90 @ 2.25	Ind. 5th Vein screenings.....	Chicago.....	1.50	1.50	1.50	1.40 @ 1.60	
Pool 1 (Navy Standard).....	New York.....		2.55	2.60	2.60	2.40 @ 2.75	Mt. Olive lump.....	St. Louis.....	2.50	2.35	2.35	2.25 @ 2.50	
Pool 1 (Navy Standard).....	Philadelphia.....		2.60	2.65	2.65	2.50 @ 2.80	Mt. Olive mine run.....	St. Louis.....	2.25	2.15	2.15	2.15	
Pool 1 (Navy Standard).....	Baltimore.....		1.85	2.15	2.15	2.15 @ 2.20	Mt. Olive screenings.....	St. Louis.....	1.75	1.55	1.55	1.50 @ 1.60	
Pool 9 (Super. Low Vol.).....	New York.....		1.95	2.05	2.05	1.90 @ 2.25	Standard lump.....	St. Louis.....	2.25	2.25	2.25	2.25	
Pool 9 (Super. Low Vol.).....	Philadelphia.....		2.00	2.10	2.10	2.00 @ 2.25	Standard mine run.....	St. Louis.....	1.80	1.80	1.80	1.75 @ 1.85	
Pool 9 (Super. Low Vol.).....	Baltimore.....		1.75	1.85	1.85	1.80 @ 1.90	Standard screenings.....	St. Louis.....	1.25	1.35	1.35	1.25 @ 1.50	
Pool 10 (H.Gr.Low Vol.).....	New York.....		1.75	1.85	1.85	1.75 @ 2.00	West Ky. block.....	Louisville.....	1.80	1.75	1.60	1.50 @ 1.75	
Pool 10 (H.Gr.Low Vol.).....	Philadelphia.....		1.70	1.85	1.85	1.75 @ 2.00	West Ky. mine run.....	Louisville.....	1.15	1.25	1.25	1.00 @ 1.40	
Pool 10 (H.Gr.Low Vol.).....	Baltimore.....		1.60	1.75	1.75	1.75 @ 1.80	West Ky. screenings.....	Louisville.....	.90	.85	.85	.80 @ .90	
Pool 11 (Low Vol.).....	New York.....		1.60	1.70	1.70	1.60 @ 1.85	West Ky. block.....	Chicago.....	1.90	1.75	1.75	1.65 @ 1.85	
Pool 11 (Low Vol.).....	Philadelphia.....		1.55	1.55	1.55	1.45 @ 1.70	West Ky. mine run.....	Chicago.....	1.35	1.15	1.15	1.00 @ 1.35	
Pool 11 (Low Vol.).....	Baltimore.....		1.40	1.65	1.65	1.65 @ 1.70							

High-Volatile, Eastern		Market Quoted	Aug. 3 1925	July 19 1926	July 26 1926	Aug. 2 1926†	South and Southwest		Market Quoted	Aug. 3 1925	July 19 1926	July 26 1926	Aug. 2 1926†
Pool 54-64 (Gas and St.)..	New York...		1.60	1.40	1.40	1.35 @ 1.50	Big Seam lump.....	Birmingham..	2.00	2.45	2.45	2.35 @ 2.85	
Pool 54-64 (Gas and St.)..	Philadelphia..		1.50	1.45	1.45	1.40 @ 1.55	Big Seam mine run.....	Birmingham..	1.75	2.00	1.85	1.75 @ 2.00	
Pool 54-64 (Gas and St.)..	Baltimore.....		1.35	1.45	1.45	1.45 @ 1.50	Big Seam (washed).....	Birmingham..	1.85	2.00	2.00	1.75 @ 2.25	
Pittsburgh sc'd gas.....	Pittsburgh....		2.40	2.25	2.25	2.20 @ 2.30	S. E. Ky. block.....	Chicago.....	2.55	2.40	2.40	2.10 @ 2.75	
Pittsburgh gas mine run.....	Pittsburgh....		2.15	2.00	2.00	1.90 @ 2.10	S. E. Ky. mine run.....	Chicago.....	1.70	1.55	1.60	1.50 @ 1.75	
Pittsburgh mine run (St.).....	Pittsburgh....		1.95	1.75	1.75	1.60 @ 1.90	S. E. Ky. block.....	Louisville.....	2.25	2.25	2.35	2.25 @ 2.50	
Pittsburgh slack (Gas)....	Pittsburgh....		1.50	1.25	1.25	1.20 @ 1.30	S. E. Ky. mine run.....	Louisville.....	1.55	1.45	1.55	1.40 @ 1.75	
Kanawha lump.....	Columbus.....		2.00	2.05	2.05	1.90 @ 2.25	S. E. Ky. screenings.....	Louisville.....	1.10	1.05	1.10	.90 @ 1.15	
Kanawha mine run.....	Columbus.....		1.40	1.55	1.60	1.50 @ 1.75	S. E. Ky. block.....	Cincinnati...	2.35	2.20	2.40	2.30 @ 2.50	
Kanawha screenings.....	Columbus.....		1.15	1.05	1.05	1.00 @ 1.20	S. E. Ky. mine run.....	Cincinnati...	1.45	1.55	1.60	1.50 @ 1.85	
W. Va. lump.....	Cincinnati...		2.35	2.25	2.35	2.25 @ 2.50	S. E. Ky. screenings.....	Cincinnati...	1.20	1.10	1.10	1.00 @ 1.25	
W. Va. gas mine run.....	Cincinnati...		1.45	1.65	1.70	1.60 @ 1.85	Kansas lump.....	Kansas City..	4.25	4.00	4.00	4.25	
W. Va. steam mine run.....	Cincinnati...		1.30	1.50	1.50	1.50 @ 1.65	Kansas mine run.....	Kansas City..	3.10	3.00	3.00	3.00	
W. Va. screenings.....	Cincinnati...		1.15	1.10	1.15	1.00 @ 1.25	Kansas screenings.....	Kansas City..	2.50	2.40	2.50	2.50	
Hooking lump.....	Columbus....		2.15	2.35	2.35	2.25 @ 2.50							
Hooking mine run.....	Columbus....		1.55	1.55	1.55	1.40 @ 1.75							
Hooking screenings.....	Columbus....		1.35	1.10	1.10	1.00 @ 1.25							
Pitta. No. 8 lump.....	Cleveland....		2.25	2.15	2.15	1.80 @ 2.50							
Pitta. No. 8 mine run.....	Cleveland....		1.90	1.75	1.75	1.65 @ 1.75							
Pitta. No. 8 screenings.....	Cleveland....		1.45	1.20	1.30	1.20 @ 1.30							

* Gross tons, f.o.b. vessel, Hampton Roads
† Advances over previous week shown in **heavy type**, declines in *italics*

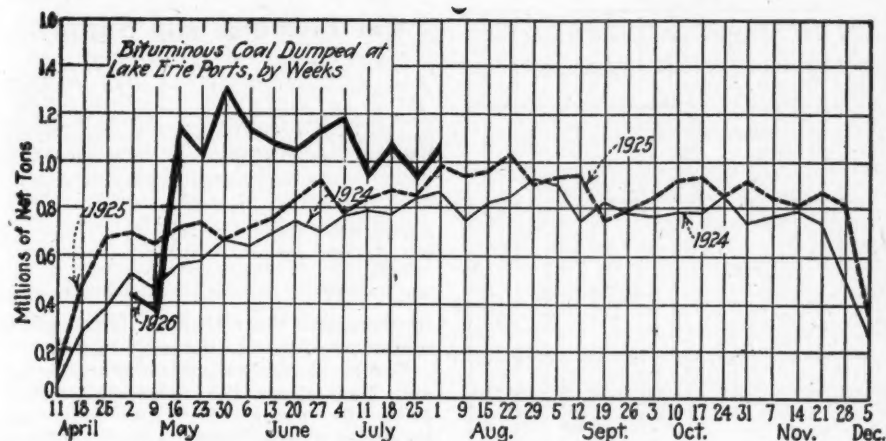
* Gross tons, f.o.b. vessel, Hampton Roads

† Advances over previous week shown in heavy type, declines in italics

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Market Quoted	Freight Rates	Aug. 3, 1925		July 26, 1926		August 2, 1926†	
				Independent	Company	Independent	Company	Independent	Company
Broken	New York	\$2.34			\$8.20@ \$8.90		\$8.50@ \$9.25		\$8.50@ \$9.25
Broken	Philadelphia	2.39			8.25@ 8.90	\$9.25	8.50@ 9.15	\$9.25	8.50@ 9.15
Egg	New York	2.34		\$9.25@ \$9.50	8.65@ 8.90	8.60@ 9.00	8.75@ 9.25	8.60@ 9.00	8.75@ 9.25
Egg	Philadelphia	2.39		8.80@ 9.40	8.70@ 8.85	9.00@ 9.75	9.00@ 9.15	9.00@ 9.75	9.00@ 9.15
Egg	Chicago	5.06		7.86@ 8.60	7.54@ 8.28	8.48	8.13	8.48	8.13
Stove	New York	2.34		9.75@ 10.00	9.15@ 9.40	9.00@ 9.50	9.25@ 9.50	9.00@ 9.50	9.25@ 9.50
Stove	Philadelphia	2.39		9.40@ 9.75	9.15@ 9.30	9.15@ 10.20	9.35@ 9.50	9.15@ 10.20	9.35@ 9.50
Stove	Chicago	5.06		8.22@ 8.70	8.32@ 8.80	8.84	8.33@ 8.58	8.84	8.33@ 8.58
Chestnut	New York	2.34		9.25@ 9.50	8.65@ 8.90	8.25@ 8.75	8.75@ 9.15	8.25@ 8.75	8.75@ 9.15
Chestnut	Philadelphia	2.39		8.80@ 9.65	8.85@ 8.90	8.50@ 9.75	9.00@ 9.15	8.50@ 9.75	9.00@ 9.15
Chestnut	Chicago	5.06		8.24@ 8.45	7.79@ 8.10	8.71	8.33@ 8.53	8.71	8.33@ 8.53
Pea	New York	2.22		5.25@ 5.75	5.00@ 5.55	6.00@ 6.50	6.00@ 6.50	6.00@ 6.50	6.00@ 6.50
Pea	Philadelphia	2.14		5.50@ 5.75	5.00@ 5.50	6.00@ 6.75	6.00@ 6.50	6.00@ 6.75	6.00@ 6.50
Pea	Chicago	4.79		4.91@ 5.36	4.91@ 5.36	6.03	5.65@ 5.80	6.03	5.65@ 5.80
Buckwheat No. 1	New York	2.22		2.25@ 2.50	2.50	1.60@ 2.25	3.00@ 3.50	1.65@ 2.25	3.00@ 3.50
Buckwheat No. 1	Philadelphia	2.14		2.15@ 2.75	2.50	1.85@ 2.50	2.25@ 2.75	1.85@ 2.50	2.25@ 2.75
Rice	New York	2.22		2.00@ 2.25	2.00	1.25@ 1.85	2.00@ 2.25	1.25@ 1.85	2.00@ 2.25
Rice	Philadelphia	2.14		1.85@ 2.00	2.00	1.30@ 2.00	1.75@ 2.25	1.30@ 2.00	1.75@ 2.25
Barley	New York	2.22		1.50@ 1.75	1.50@ 1.60	1.25@ 1.60	1.75@ 2.25	1.25@ 1.60	1.75@ 2.25
Barley	Philadelphia	2.14		1.40@ 1.50	1.50	1.25@ 1.75	1.50@ 1.75	1.25@ 1.75	1.50@ 1.75
Birdseye	New York	2.22			1.60	.75@ 1.50	2.00	.75@ 1.50	2.00

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type; declines in italics.



covering their needs further ahead. Iron interests are buying largely for immediate requirements. Takings by utilities and municipal heating plants is seasonally light, but several are reported to have placed yearly contracts at list prices during the last ten days.

Dealers' orders are light, with the credit situation a factor. This is having marked effect on anthracite, shipments of which from the docks are limited even for midsummer. Meanwhile Pocahontas and other smokeless coals are increasing in favor with former hard-coal consumers. Pocahontas egg and lump are held at \$7; stove, \$6.75; mine-run, \$5.25, and screenings \$4.25. Domestic coke is unchanged at \$8.50 and briquets at \$9.

Of the forty-nine cargoes unloaded at the docks last week only three were anthracite, and of eighteen reported en route two are anthracite.

At the Twin Cities the volume of tonnage moving is increasing slightly as the summer wears away. The crop harvest is not expected to be better than average, though late crops promise well, with the prospect of good prices, which is expected to help the demand for coal. Anthracite is getting only scant attention, while demand for smokeless is increasing. Southern Illinois lump is still quoted at \$2.75; central Illinois, \$2.35; western Kentucky, \$1.50.

The call for all grades of coal has strengthened at Milwaukee; even anthracite seems to be coming into more favor. Prices are unchanged except for an advance of 25c. in Pocahontas on orders filled by direct shipment from the mines. Receipts of coal by lake continues heavy, and there will be no trouble in keeping the docks well supplied for westbound rail shipments.

Southwest Operations Active

Active wholesale demand kept Southwestern mines busy last week. No serious accumulations on track are reported in Kansas or other fields. Orders for storage coal are increasing and demand for Kansas nut for threshing purposes also is an important factor in the healthy tone of the market. Prices effective Aug. 1 show a 25c. rise in Cherokee deep shaft lump to \$4.25 and in Kansas shovel lump to \$3.75. Arkansas semi-anthracite is unchanged at \$5@6 for Greenwood and Sebastian County and \$6.50 for Paris lump. Spadra (Ark.) anthracite has advanced 50c. a ton; McAlester (Okla.) lump, 35c.

In Colorado there has been a marked

nut moving to the west and northwest are \$2.50 and on the traffic moving east bound into Colorado, Nebraska and Kansas the price is \$4; steam coal, \$1@1.50.

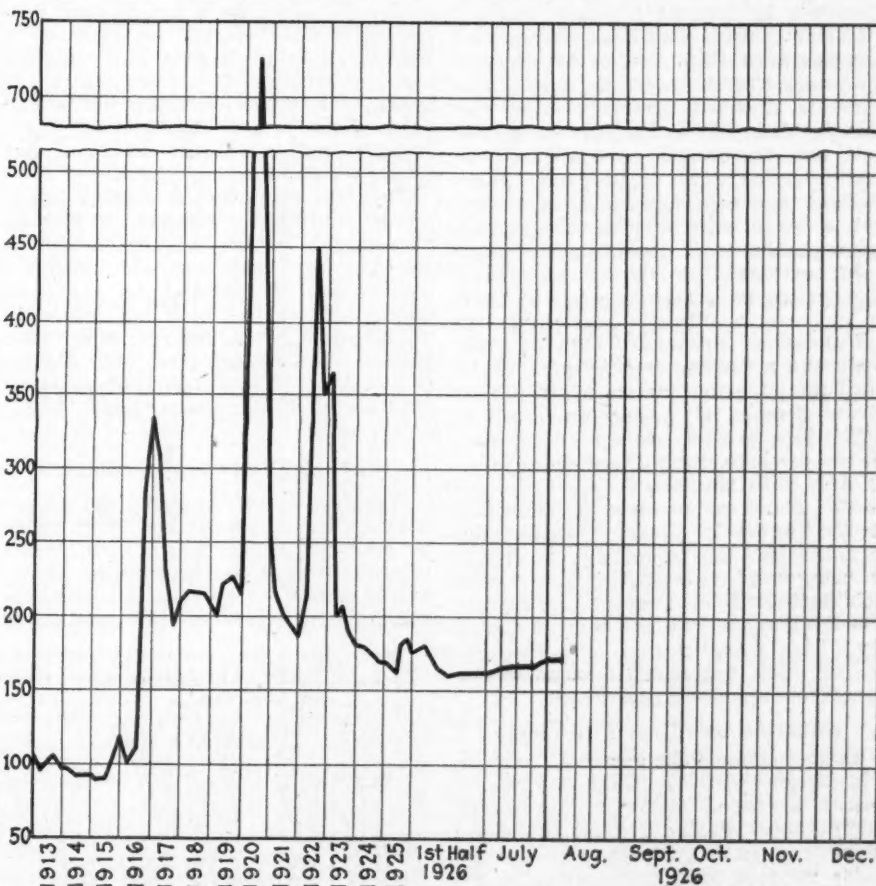
Strength Gathering at Cincinnati

Business is gathering momentum in Cincinnati. There have been several upward tilts in price and some West Virginia producers quote August prices for only the first half of the month. Domestic demand has been marked by flattering orders from Michigan, Indiana and Iowa points. High-volatile lump and block have advanced about 25c., but the top on egg and 2-in. have been scaled down, with the range \$1.75 @ \$2. Mine-run is strong, practically any sort commanding \$1.50; high-grade splints bring \$1.60@1.65. Gas and byproduct mine-run has advanced to \$1.85. Slack, after a temporary weakness caused by a flood of Hazard offerings, has recovered to the usual spread of \$1@1.25.

For low-volatile a large volume of orders for lump and egg is coming from inland and western points. Some firms are asking as high as \$3.50. Mine-run is strong at \$2 and a step-up is expected. Slack is less firm with spot at \$1.25@1.35 and occasionally \$1.50.

Local retail deliveries exhibit no increased signs of life.

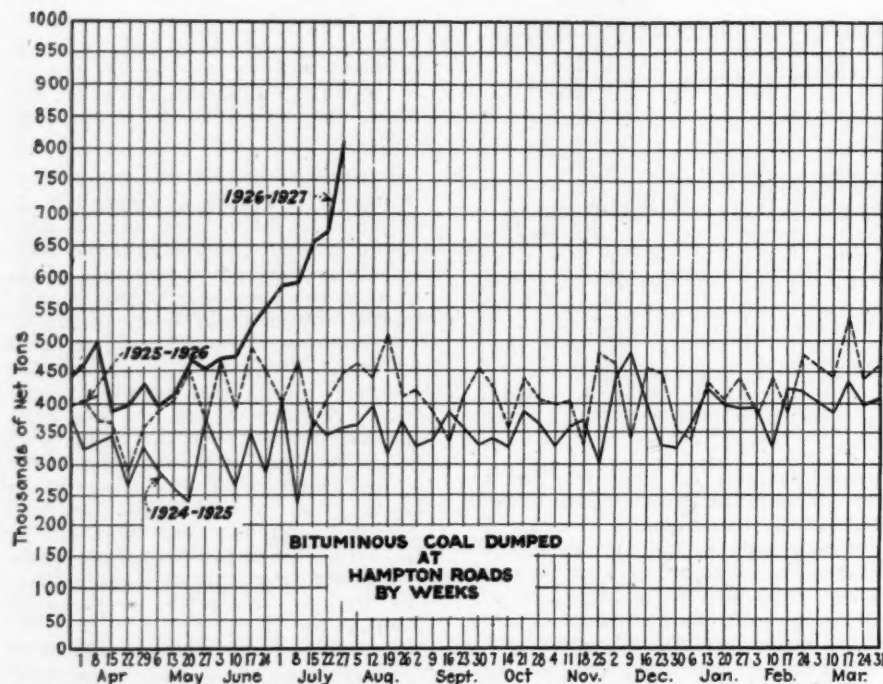
During the week ended July 31



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	Aug. 2	July 26	July 19	July 12	Aug. 3	Aug. 4
Index	159	159	157	158	163	163
Weighted average price.....	\$1.92	\$1.92	\$1.90	\$1.91	\$1.97	\$1.98

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.



13,708 coal loads were interchanged in the Cincinnati district—a decrease of 429 cars from the preceding week and of 749 cars from last year. Included in the coal movement were 3,571 cars of lake coal en route to Toledo and Sandusky for the lake trade. The interchange of empties—11,814 cars—showed a decrease of 174 cars.

Domestic trade was firmer in central and southern Ohio last week, though the interest of the rural districts in the harvests diverted attention from the fuel problem. Steam business continues dull and featureless, consumers generally buying only for current needs. Utilities and railroads are most active, but a large part of this tonnage is being purchased on the open market.

In northern Ohio the recent rise in spot prices on screenings caused such an increase in offerings that slack and nut-and-slack dropped 5 to 10c. last week and a further drop is quite likely until the situation adjusts itself. Other steam demand is rather quiet, but a better tone prevails than a month ago. In the domestic trade Pocahontas lump is firm with the August quotation at \$3.25. No. 8 mine-run is \$1.65, which is the lowest in years. Steam lump is not active and practically no 1½-in. is being made. Output in the No. 8 field during the week ended July 24 was 193,000 tons, or 27.6 per cent of capacity. This was 106 tons over the preceding week, but 43,000 tons under the corresponding week a year ago.

Situation Steady at Pittsburgh

Export demand for gas coal from the Pittsburgh district is fairly steady, and prices averaged about 5c. below the recent top. Sales of ¾-in. lump are chiefly at \$2.25. Steam coal demand holds up quite well as industrial activity has been well sustained this summer. It is impossible, however, to interest the line trade generally in stocking. Demand for domestic coal has not developed to any extent thus far. The price of slack has not declined; steam brings \$1.15@1.25 and gas \$1.20@1.30.

Prices remain stable in the central

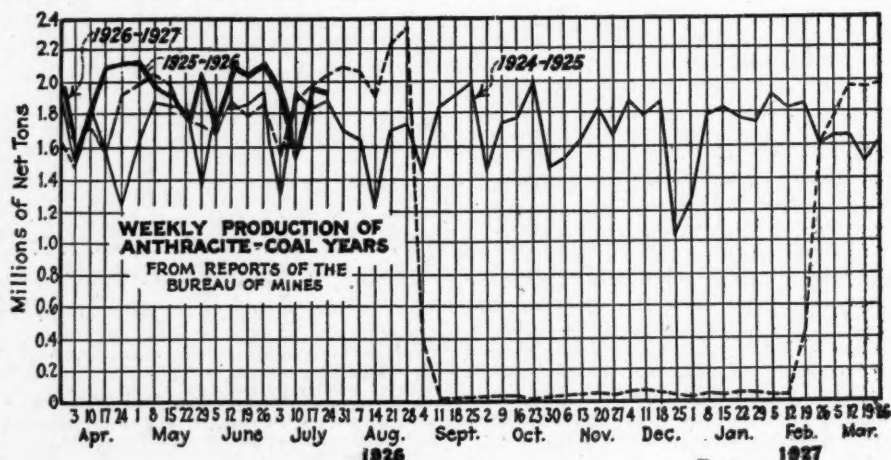
Pennsylvania field and production figures show little change. Loadings for the week ended July 24 were 13,796 cars, compared with 14,116 in the preceding week. Total loadings for July up to the 24th were 45,362 cars, compared with 44,917 car loads for the corresponding period in June.

The fact that little unsold coal lags in the Buffalo market is taken as a hopeful sign, but there is still room for much improvement. Low-volatile is quiet, with prices quatably unchanged from recent levels. Demand for high-volatile coal is slightly stronger, but without any effect on prices.

The Toronto soft-coal market is extremely dull, but is expected to pick up considerably within the next month or so. The hard coal trade also expects a quickening of demand as summer wanes. There has been no change in prices, which are as follows: anthracite (stove), \$15.75; egg and nut, \$15.25; pea, \$12.50; coke, \$12.50; Pennsylvania smokeless, \$5.85; steam lump, \$6.25; slack, \$5.50.

New England More Confident

Steam quotations in New England are notably firmer, production being scaled to what the market will absorb. While this territory is not accounting for its proper share of the spot demand consumers are accepting full quotas on



Car Loadings and Supply

	Cars Loaded		Surplus Cars		Car Shortages	
	All Cars	Coal Cars	All Cars	Coal Cars	All Cars	Coal Cars
Week ended July 17, 1926.....	1,083,626	183,486				
Preceding week.....	900,977	147,780				
Week ended July 18, 1925.....	1,010,970	170,742				
July 15, 1926	235,839	70,935				
July 8, 1926	239,167	72,265				
July 14, 1925	309,560	111,449				

contract and there seems a shade more confidence in prices during August.

For No. 1 Navy Standard Pocahontas and New River the range is \$4.60@ \$4.75 per gross ton f.o.b. vessel at Hampton Roads, with rumors of spot sales up to \$5.

Inland from Providence and Boston there have been advances to \$5.60@ \$5.75 on cars for high-grade coal. There is enough request to take care of current arrivals, but reserves are not at all likely soon to be depleted, with contract coal coming forward in reasonably good volume.

The Pennsylvania coals show practically no reaction from the low points that have been characteristic now for several months.

Optimism Grows at New York

Although orders at New York fail to show a material increase, inquiries are more frequent and there is considerable optimism in the trade. Railroads and cement plants are increasing their purchases and there are indications too that efforts are being made to increase reserves. Exporters report a good demand for gas coals at fair prices. Outside of heavier bunkering the tidewater market is featureless. Many vessels continue to take double cargoes of coal in order to make the return trip to this port.

The Philadelphia market, which for months has been devoid of any real change, is showing signs for the better. This is reflected in more inquiries and increasing exports.

At Baltimore demand is active for export and bunker coals while orders for home consumption are hard to find.

At Birmingham there has been a sprinkling of spot orders, but in the aggregate the tonnage is comparatively unimportant. Deliveries on contracts are better than normal for this period. The bunker trade, however, is not noticeably better. Quotable prices on steam grades are unchanged. Little

domestic coal is moving, but most yards are stocked reasonably well. Mine prices effective Aug. are as follows: Big Seam lump, \$2.35@2.85; Carbon Hill, \$3.10; Cahaba, \$4.30@4.80; Black Creek, \$4.30@4.55; Corona, \$3.35; Montevallo seams, \$5@5.55. The coke market is stable, demand for all grades being favorable and prices firm. Production is almost up to normal even capacity.

Hard-Coal Market Stiffens

The New York anthracite market is firmer with prices for independent coals steadier, but fall activity is not expected to set in until Aug. 15. All domestic sizes show betterment; even chestnut, which was slow and inactive, participated in the upward trend and is in better demand. The steam grades also are moving more freely, but there has not been any improvement in prices.

At Philadelphia, however, output moves only with difficulty, but the trade is confident that a pronounced change for the better will take place in August. Though company producers have been making only five days a week, they are storing egg, stove and nut. All company pea has been able to find a market. Independent shippers also have been compelled to curtail working time, and are able to move output only by making special inducements. Steam coals continue unsatisfactory. The Baltimore hard-coal trade, while still rather flat, is better than a month ago.

Lagginess marks the trade at Buffalo. Lake shipments have improved since the broken trestle at one of the piers was repaired. The total for the week ending July 29 was 90,500 tons, of which 56,300 tons cleared for Duluth and Superior, 22,100 tons for Milwaukee and 12,100 tons for Fort William.

Connellsville Coke Market Firmer

The spot coke market at Connellsville has stiffened distinctly in the past week. Demand is still quite light, but the hot weather last week delayed some drawing and curtailed production, while there also is the influence that some operators are turning more to coal. Spot furnace coke was quoted at \$2.85@3 against \$2.75@2.85 a week ago. Spot foundry coke remains quotable at \$4@4.50, in general, but sales are averaging somewhat higher within this range. Supplies over and above contract requirements are quite light.

Production in the Connellsville and Lower Connellsville region in the week ended July 24, according to the Connellsville *Courier*, was 112,950 tons, a decrease of 13,800 tons from the preceding week's total. Furnace-ovens output was 54,200 tons, a decrease of 16,000 tons. Merchant-ovens produced 58,750 tons, an increase of 2,200 tons, making a total of 112,950 tons, a decrease of 13,800 tons.

The Coal River Collieries Co., Huntington, W. Va., owned by the Brotherhood of Locomotive Engineers, will remove its offices to Cleveland, on Aug. 1, it is reported. The offices there will be connected with Fuel Distributors, Inc., which, it is said, will act as exclusive sales agent for the Coal River Collieries Co.

British Figures Show Fallacy Of Reorganization Plans

Advocates of a policy of "Back to the Report—the whole Report, and Nothing but the Report" as a solution of Britain's coal troubles are in danger of being drugged by a slogan almost as unpractical as that of the miners' leaders themselves in the opinion of many observers. What practical steps could and should be taken under this policy that are not being taken already either by the government or by the colliery owners—always bearing in mind that the problem to be solved is how wages and costs may be met on the first and succeeding pay days after a resumption of work.

Money for that purpose cannot come out of the possible savings from schemes of reorganization which, as the Commission itself admitted, must take months or even years to bring to fruition. Moreover, there is no very reliable estimate of the cash value of the reorganization proposals. The Commission did not make any, and such as have been put forward by other persons range from 3d. to 6d. per ton. The gap between selling price and cost of production, which has somehow to be bridged, amounts on the average to about 2s. 6d. a ton.

Debit in Scotland

It is worth while looking at some actual figures relating to certain districts and inquiring how the debit balances that they show could be turned into credit balances by the policy of "Back to the Report."

In Scotland, for the three months of the March quarter of 1926, according to the official summary issued by the Mines Department, the following results were obtained (excluding subsidy):

Proceeds from sale of coal.....	£5,612,892
Proceeds from miners' coal.....	80,362
	£5,693,254
Wages	£4,529,410
Stores and timber.....	724,361
Other costs	914,931
(management, salaries, insurances, general expenses, etc., etc.)	
Miners' welfare	36,332
Royalties	227,652
	£4,432,686
Debit balance	*£739,432
*Approximately 1s. 8½d. per ton.	

This is equivalent to about 16 per cent of the wages bill without allowing anything for profits or even for such items as interest on loans and debentures, estimated at 3d. per ton, or about £100,000, which are not admissible as costs other than wages for the purpose of ascertaining wages, and are therefore not included in these returns.

This item of other costs includes, among other charges, approximately £60,000 for local rates, £120,000 for workmen's compensation, £102,000 for health and unemployment insurance, £114,000 for the salaries of clerical and administrative staff, £66,000 for the purchase of coal and power, £80,000 for depreciation and £100,000 for repairs and renewals.

In Northumberland during January, February, March, 1926, the debit balance was £448,628, or 2s. 8d. per ton,

Study What to Do About Alberta Coal Industry

What to do about the Alberta coal mining industry is now being taken up by the provincial government, and a conference between Premier Brownlee and members of the government coal commission has been held for the purpose of going over the Commission's recent report. Chairman H. M. E. Evans, John T. Stirling and R. G. Drinnan were present from the board members, with Alex Ross and R. J. Dinning, special industrial adviser, also sitting in. Three fields of study, Mr. Brownlee, states, are to be explored as fully as possible, namely, how to put production on a better basis by increasing the period of operation, relationships between the industry and labor and the extension of marketing service, the latter including the question of freight rates. On all these points the Commission made recommendations, and the Premier says that its report has proved to be a highly useful and satisfactory one.

"Unquestionably, we shall have to do something about the Alberta coal industry," it is acknowledged by Mr. Brownlee, "and the Cabinet will be deciding soon what definite action it shall take. Our action will be based in some measure, at least, and perhaps very largely, upon the recommendations of the Commission."

which is equivalent to 26 per cent of the wages bill, again without taking account of any profit or even of excluded charges (interest on debentures, etc., which are not included as costs other than wages), amounting to about £40,000.

In South Wales there was a debit balance in the March quarter, 1926, of £1,726,849, or 3s. 1½d. per ton, equivalent to 22 per cent of the wages bill.

These figures disclose a situation that cannot be met by the mere repetition of a slogan, whether it be "Back to the Report" or "Not a Penny Off." There seems to be little hope of bridging the gap in those three districts by vague talk about a wage reduction of 10 per cent when the debit amounts to over 20 per cent of the wages bill.

Traffic News

Grouping of Alabama mines under one rate, as sought by coal dealers of Meridian, Miss., has not been justified in the opinion of Interstate Commerce Commission Examiner Arthur R. Mackley. He has recommended that the Commission dismiss the case.

A complaint alleging that freight rates on anthracite to the Albany (N. Y.) district are unreasonable has been filed with the Interstate Commerce Commission by Edgar G. Bailey, of Rensselaer, N. Y., and other residents of places in that part of New York State.

Foreign Market And Export News

Boom in German Export Trade Fails to Materialize

The reduction of the large coal stocks in Germany as a result of the British strike has not proved to be so great as was generally expected according to advices to the Department of Commerce from Trade Commissioner William T. Dougherty, Berlin. One reason advanced is that Ruhr stocks were largely coking coal, while the call has been chiefly for bunker and fine coal.

The British strike has occasioned no over-time in German mines, but it is said to have undoubtedly prevented further dismissals of miners which were considered to be imminent at the time of its outbreak. The Ruhr mines are now using about 375,000 miners, with the prospect of dismissing 100,000 of these in case the strike is called off and normal European coal trade resumed. In May, 1926, daily Ruhr production, although slightly increased over that for previous months in the present year, was only 347,362 tons, a level that was exceeded during several months in 1925.

The following table shows the German coal production during the first five months of the current year:

Month	Ruhr Metric Tons	Upper Silesia Metric Tons	Total Germany Metric Tons
January.....	8,401,992	1,455,000	11,190,004
February.....	8,050,361	1,331,000	10,611,224
March.....	8,584,366	1,515,000	11,424,278
April.....	7,757,798	1,200,000	10,085,944
May.....	8,336,680	1,209,000	10,678,249

During the first five months of 1926 the trade balance has amounted to 4,271,968 metric tons, exports totaling 6,551,885 tons and imports 2,279,917 tons. German exports for the period included 118,000 tons to the United States, 3,000,000 tons to the Netherlands, 758,000 to Italy, 337,000 to Czechoslovakia, 343,000 to Belgium, 315,000 to France, 243,000 to Sweden and 159,000 to Argentina.

British Coal Order Increased

The British government has come into the market for 300,000 tons of coal, in addition to the 2,000,000 already under contract to be shipped to the United Kingdom through Hampton Roads.

Castner, Curran & Bullitt, the Cory-Mann-George Corporation, and General Coal Co. each have contracted to supply 100,000 at a figure not announced. The coal was bought on a non-competitive plan, the shippers agreeing to furnish it on a percentage basis. The contract was placed by Lambert Bros., Ltd., of London, who will charter vessels to carry the coal.

All three Hampton Roads terminals have been operating for six weeks 24 hours a day, seven days a week, and there appears no immediate prospect of a let-up. The Chesapeake & Ohio, which is handling the bulk of the move-

ment of high-volatile coal, which represents practically all of the British contracts, has had to put several embargoes on coal movement to Newport News recently, extending for 24 hours or more.

June Coal Output in Ruhr Exceeds 1913 Rate

Ruhr coal production in June attained a weekly average of 2,200,000 tons, slightly above the average of 1913 and of 1925. Ruhr coal stocks on hand have decreased 30 per cent since April. May coal exports increased over April by 59 per cent, with a decrease in imports of 40 per cent. This marked improvement is due almost entirely to the increased business received as a result of the British strike. In order to consolidate the advantages thus gained, the German coal industry is insisting that present purchasers sign long-term contracts.

Brazilian Imports of U. S. Coal Below Pre-War Figure

The Brazilian market for United States and British coal has not returned to its pre-war importance, according to Brazilian import figures covering recent post-war years, states a report to the Department of Commerce from Consul General A. Gaulin, Rio de Janeiro. The United States appears to have strengthened its foothold in that market, however, during recent years.

In 1913 Brazilian coal imports from the United Kingdom were 2,111,000 metric tons while the United States' share of the imports totaled 726,000 metric tons. In 1922 the receipts from the United Kingdom had declined to 1,010,000 metric tons and the United States' contributions had dropped to 152,000 metric tons. The following year the share of the United Kingdom increased to 1,189,000 metric tons and that of the United States to 311,000 metric tons. In 1924 the British portion of the Brazilian receipts had dropped to 798,000 metric tons while the imports from the United States had risen to 759,000 metric tons. In 1925 the share of the United Kingdom increased to 1,097,000 metric tons while that of the United States declined to 587,000 metric tons.

Export Clearances, Week Ended July 29

FROM HAMPTON ROADS

For United Kingdom:	Tons
Br. Str. Grellise.....	7,139
Br. Str. American Transport.....	7,532
Span. Str. Salazar.....	4,509
Ital. Str. Giovanna Florio.....	7,237
Ital. Str. Buccari.....	6,402
Ger. Str. Brema.....	7,489
Br. Str. Tabarka.....	5,881
Br. Str. Marslew.....	7,303
Ital. Str. Gerochia.....	7,964
Grk. Str. Georgios.....	6,896
Grk. Str. Chelatos.....	6,220
Du. Str. Hilversum.....	5,471
Br. Str. Bryntawe.....	4,940
Span. Str. Kauldi.....	4,713

For United Kingdom:	Ton
Br. Str. Eskbridge, for Lisbon.....	5,278
Span. Str. Bartolo.....	4,610
Grk. Str. Eugenia.....	5,814

For Brazil:	
Br. Str. Porthia, for Bahia.....	5,373
Br. Str. Langford, for Rio de Janeiro.....	6,367
Fr. Str. Alsace II, for Grande Do Sul.....	6,215
Fr. Str. Union, for Santos.....	7,087
Br. Str. Lesreaulx, for Pernambuco.....	6,677

For Jamaica:	
Br. Str. Uskmoor, for Kingston.....	3,634
Amer. Str. Levisa, for Kingston.....	2,526
Br. Str. Mayari, for Kingston.....	3,319

For Italy:	
Ital. Str. Boheme, for Venice.....	6,749
Br. Str. Pentirion, for Palermo.....	3,766
Amer. Str. Saucon, for Genoa.....	3,494
Ital. Str. Alberta, for Venice.....	5,293

For Wales:	
Ger. Str. Real, for Swansea.....	4,600

For Scotland:	
Grk. Str. Emmanuele Stavroudis, for Glasgow.....	6,932
Amer. Str. Herman Frasch, for Glasgow.....	5,810

For Argentina:	
Du. Str. Bellatrix, for Buenos Aires.....	4,581

For Portugal:	
Port. Str. Gaza, for Lisbon.....	6,210
Port. Str. Luso, for Lisbon.....	8,086

FROM BALTIMORE

For Ireland:	
Ital. Str. San Pietro, for Queenstown.....	7,495
Br. Str. Wokingham, for Dublin.....	5,520
Gr. Str. Michael L. Embriscos, for Queenstown.....	7,324
Br. Str. Newtonmoor, for Queenstown.....	6,071
Br. Str. Manchester Citizen.....	7,875
Br. Str. Zimorodok for Belfast.....	5,558
Br. Str. Victorian Transport, for Queenstown.....	7,378
Br. Str. Camberly.....	5,067
Swed. Str. Eda Gorthon.....	3,492

For England:	
Nor. Str. Salonica, for Dover.....	4,265
Br. Str. Snowdon.....	6,129
Br. Str. Highland Prince.....	6,981
Swed. Str. Sillian.....	5,626

For Italy:	
Ital. Str. Humanitus.....	6,447

For Argentina:	
Gr. Str. Nicos, for La Plata and Zarati.....	6,522

FROM PHILADELPHIA

For Great Britain:	
Br. Str. Zamora, for River Mersey.....	—
It. Str. Monte Maggiore, for Queens- town.....	—

For Newfoundland:	
Br. Str. Marstenen, for St. John's.....	—

For Cuba:	
Nor. Str. Haraldshaug, for Antilla.....	—

For Nova Scotia:	
Br. Str. Fred Cleaves, for Halifax.....	—

Hampton Roads Coal Dumpings

(In Gross Tons)

	July 22	July 29
N. & W. Piers, Lamberts Pt.: Tons dumped for week.....	220,511	305,023
Virginian Piers, Sewalls Pt.: Tons dumped for week.....	155,139	189,997
C. & O. Piers, Newport News: Tons dumped per week.....	222,367	224,238

* Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

PIERS

	July 24	July 31†
Pool 1, New York....	\$5.40@ \$5.65	\$5.40@ \$5.65
Pool 9, New York....	4.90@ 5.10	4.90@ 5.10
Pool 10, New York....	4.60@ 4.85	4.60@ 4.85
Pool 11, New York....	4.35@ 4.50	4.35@ 4.50
Pool 9, Philadelphia....	4.85@ 5.20	4.85@ 5.20
Pool 10, Philadelphia....	4.60@ 4.85	4.60@ 4.85
Pool 11, Philadelphia....	4.30@ 4.55	4.30@ 4.55
Pool 1, Hamp. Roads....	4.50@ 4.60	4.65@ 4.75
Pool 2, Hamp. Roads....	4.35@ 4.40	4.45@ 4.55
Pool 3, Hamp. Roads....	4.10@ 4.20	4.20@ 4.30
Pools 5-6-7, Hamp. Rds....	4.15@ 4.25	4.35

BUNKERS

Pool 1, New York....	\$5.65@ \$5.90	\$5.65@ \$5.90
Pool 9, New York....	5.15@ 5.35	5.15@ 5.35
Pool 10, New York....	4.85@ 5.10	4.85@ 5.10
Pool 11, New York....	4.60@ 4.75	4.60@ 4.75
Pool 9, Philadelphia....	5.10@ 5.35	5.10@ 5.35
Pool 10, Philadelphia....	4.90@ 5.10	4.90@ 5.10
Pool 11, Philadelphia....	4.55@ 4.85	4.55@ 4.85
Pool 1, Hamp. Roads....	4.60	4.75
Pool 2, Hamp. Roads....	5.40	4.55
Pools 5-6-7, Hamp. Rds....	4.25	4.45

† Advances over previous week shown in heavy type; declines in *italics*.

Coming Meetings

Fourth Annual West Virginia First-Aid Contest and First Annual Safety Day, Camden Park, Huntington, W. Va., Aug. 21. Managing Director, W. H. Forbes, Federal Building, Huntington.

Fifth International First-Aid and Mine-Rescue Contest, San Francisco, Calif., during the first week of September, 1926, under auspices of Bureau of Mines, Department of Commerce.

New York State Coal Merchants Association. United States Hotel, Saratoga Springs, N. Y., Sept. 2-4. Executive secretary, G. W. F. Woodside, Dolan Bldg., Albany, N. Y.

Rocky Mountain Coal Mining Institute. Glenwood Springs, Colo., Sept. 9-11. Secretary, Benedict Shubart, Boston Building, Denver, Colo.

American Institute of Mining and Metallurgical Engineers. Oct. 6-9, at Pittsburgh, Pa. Secretary, H. Foster Bain, 29 West 39th St., New York City.

National Safety Council. Oct. 25-29, at Detroit, Mich. Managing director, W. H. Cameron, 108 East Ohio St., Chicago, Ill.

National Industrial Traffic League. Commodore Hotel, New York City, Nov. 17 and 18. Executive secretary, J. W. Beek, Chicago, Ill.

Coal Mining Institute of America. Annual meeting, Chamber of Commerce, Pittsburgh, Pa., Dec. 8, 9 and 10. Secretary, H. D. Mason, Jr., Box 604, Ebensburg, Pa.

New Companies

The Bainbridge Coal Co., of Herrick, Jefferson County, Ohio, has been chartered with a capital of \$30,000 to mine and sell coal. The incorporators are Joseph Bainbridge, Louis DeLuca, James Wesley, James Fowler and David H. James.

The Standard Elkhorn Coal Co., Huntington, W. Va., has been chartered to purchase coal land and produce coal. The chief works are at Garrett, Floyd County, Ky. There have been 1,000 shares of no-par value stock issued. The incorporators are S. S. McNeer, D. C. Tomkies, J. T. Delaney, B. L. Spradlin and M. L. Burnett, all of Huntington.

The Willow Coal Co., of Clarksburg, W. Va., has been chartered for the purpose of acquiring coal land and mining coal. The incorporators are Thomas P. Keenan, Emma H. Horner, Benjamin H. Britt, Grace D. Britt and M. R. White, all of Clarksburg, W. Va.

The Atlantic Gas Process Corporation, New York City, has been chartered at Albany, N. Y., with capital of 200 shares of no par value, to process bituminous coal, oil, shale, etc. John L. Murrie, 115 Broadway; Albert Schwarz, 25 Broad St., and Charles P. Brown, 29 Broadway, New York City, are directors and subscribers.

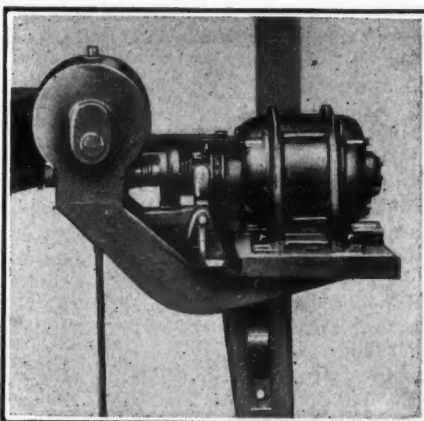
The Farmington Coal Mining Co., 28 East Jackson Blvd., Chicago, has been incorporated with capital of \$25,000 by Lyle H. Dayhoff, Judson D. McCarthy and Francis Bloodgood, Jr.

New Equipment

Speed Reducer Unit for Use With Small Machines

The "Motor-It" speed-reducer unit marketed by the Utility Manufacturing Co., Cudahy, Wis., is for use with any type of small machine. The unit shown has a disk clutch operated by means of a foot lever and is intended for short intermittent operation. For longer intermittent operation an expanding-type clutch is furnished, and for an electrically controlled machine a flexible coupling is used.

The motor runs at 1,800 r.p.m., and any desired speed reduction can be specified. Reduction is made by means of a worm and wheel or spiral gears. Roller or ball thrust bearings are used. These units can be applied to any type of machine now driven by means of a belt or gear. The new unit can be put on the shaft in place of the tight-and-loose pulley or clutch, as the unit is bored to fit the customer's shaft. The gear set is completely inclosed.



Speed Reducer for Small Machines

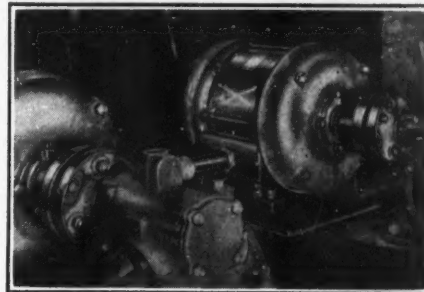
A disk clutch is provided which is operated by a foot lever. The unit is suited for short intermittent operation. Other arrangements are made for more continuous running.

The unit is furnished with motor, clutch, and reduction gear. The motor is supplied in $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1-, 1 $\frac{1}{2}$ -, and 2-hp. sizes.

Eliminates Metal-to-Metal Bearing Surfaces

A flexible shaft coupling, known under the name of "Flexoid," has been placed on the market by the Smith Power Transmission Co., 1218 Ontario St., Cleveland, Ohio. The new coupling, an application of which is shown in the accompanying illustration, consists of two cast-iron flanges coupled together with one or more flexible fabric disks in such a manner that there are no metal-to-metal bearing surfaces.

A joint of high strength and flexibility is claimed for this coupling. It is designed to permit a 6-deg. misalignment of the shafts without chatter. It requires no lubrication. The fabric



Cast-Iron Flanges Coupled with Flexible Fabric Disks

Coupling is said to be so flexible that a 6-deg. misalignment in the shafts connected allows them to operate without chattering.

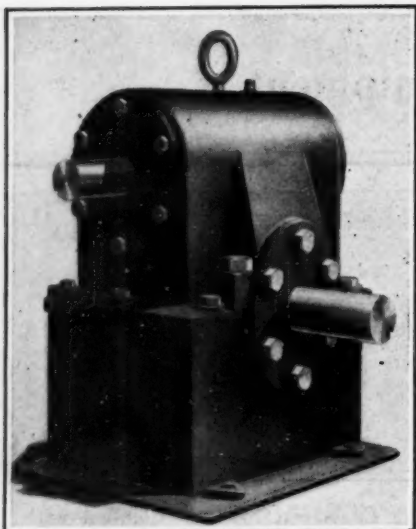
is specially treated, and is impervious to oil and water. It also insures complete electrical insulation of the sections of the shaft. These couplings are made in eight sizes with capacities from 2 to 100 hp. at 1,000 r.p.m. They can be used efficiently on reversing drives, and are claimed to absorb shocks.

High Efficiency Claimed for Speed Reducer

Speed reducers of various kinds are finding an ever-widening field of application for driving various types of machinery in and about the mines. One of the latest devices of this kind is shown in the accompanying illustration and is known as a "Worm Gear Power Transformer." It is manufactured by the William Ganschow Co., Washington Boulevard, Chicago. All moving parts of this speed reducer are completely protected from damage by dirt, grit or moisture, and operate in an oil bath, the base of the housing forming a reservoir for the lubricant. The housings are symmetrical and either the worm or gear-shaft extensions may be reversed if desirable.

Standard units are equipped with a special bronze gear, which is said to give a large load-carrying capacity. The gear teeth are generated on a tangential-feed hobbing machine to a correct tooth form. The face width of the gear is so proportioned that the unit pressure imposed by the load is far below the safe working stress of the metal. The smaller units have a solid bronze gear but the larger ones are fitted with a rim that is shrunk and studded to place on a cast-iron center.

The worm is said to give high efficiency because it is designed so that rolling contact has been increased to a maximum and sliding contact reduced to a minimum. Nickel steel (3 $\frac{1}{2}$ per cent) is employed for making the worm. This is carbonized, hardened and ground giving a hard exterior and a tough center of high tensile strength. Anti-friction thrust bearings of either the ball or roller type are applied throughout. These are amply strong for the loads



In This Speed Reducer Shafts Are Reversible

The housing of this gear reduction is symmetrical. As a result either the worm or gear shaft, or both may be turned end for end giving the complete unit a wide range of application.

imposed, and the manufacturer declares that the device as a whole possesses unusual accuracy and durability.

Detachable Coal-Auger Bit

Practically all the wear sustained by the ordinary coal auger comes on the point. In the accompanying illustration may be seen the "Gold Edge" bit, distributed by Morton D. Barker, of 1028 East Madison St., Springfield, Ill. This device is detachable, is made of a heat-treated alloy steel and has, it is claimed, from five to ten times the strength, sharpness and lasting service of the ordinary auger bit.

This bit is uniformly and accurately formed by means of dies, embodies a scientifically correct cutting principle that reduces the power required and speeds up the work of shothole drilling. It is blanked, formed and ground in one operation on automatic machines, and can be supplied at less cost than that entailed in forging the old style bit by hand.

But the detachable bit not only provides a superior steel and cutting principle at lower cost, but it is said to eliminate also the sharpening of augers in the mine blacksmith shop and consequently the expense, danger and inconvenience entailed in continually transporting augers into and out of

the mine for sharpening purposes. When worn dull this bit can be instantly re-edged on an emery wheel or a new one substituted, without removing the auger from the working place.

A small investment for a socket and about 3-min. work by the blacksmith equips any style or size of old auger with this new bit. A small forged socket carrying the same twist as the standard auger is riveted permanently to the end of the old auger and, it is said, will last indefinitely. These new bits are made in sizes for drilling from 2- to 3-in. holes and in types suited for electric drills, hand machines and breast augers. The sizes need not be varied to suit different lengths of augers.

Recent Patents

Mine-Car Coupling; 1,571,345. Hugh W. Sanford, Knoxville, Tenn. Feb. 2, 1926. Filed March 23, 1922; serial No. 546,050.

Cartridge for Blasting Powder; 1,571,478. Alfred J. Hirthler and John Dreistadt, Wilkesbarre, Pa. Feb. 2, 1926. Filed Oct. 8, 1924; serial No. 742,413.

Skip-Hoist Bucket; 1,571,784. Robert H. Beaumont, Radnor, Pa., assignor to R. H. Beaumont Co., Philadelphia, Pa. Feb. 2, 1926. Filed May 19, 1921; serial No. 470,753.

Mining Machine; 1,572,066. Russell E. Booker, Windber, Pa. Feb. 9, 1926. Filed Jan. 11, 1922; serial No. 528,436.

Mine Drill; 1,572,067. Russell E. Booker, Windber, Pa. Feb. 9, 1926. Filed Jan. 11, 1922; serial No. 528,437.

Container for Testing Coal and Method of Testing; 1,572,391. Walter J. Klaiber, Chicago, Ill., assignor to the Koppers Co., Pittsburgh, Pa. Feb. 9, 1926. Filed Sept. 12, 1923; serial No. 662,229.

Loading Machine; 1,581,705. Charles E. Waxbom, Columbus, Ohio, assignor to the Jeffrey Mfg. Co., Columbus, Ohio. April 20, 1926. Filed June 24, 1924; serial No. 722,079.

Electric Blasting Cap; 1,581,799. Harry L. Grant, Tamaqua, Pa., assignor to the Atlas Powder Co., Wilmington, Del. April 27, 1926. Original application filed July 22, 1925; serial No. 45,327. Divided and this application filed Dec. 7, 1925; serial No. 73,637.

Method of Blasting and Apparatus; 1,582,273. Joseph F. Joy, Pittsburgh, Pa., assignor to the Joy Machine Co.,

Pittsburgh, Pa. April 27, 1926. Filed Jan. 24, 1924; serial No. 688,185.

Mine Car; 1,582,312. Chester D. Sensenich, Irwin, Pa. April 27, 1926. Filed Aug. 19, 1925; serial No. 51,114.

Mine Car; 1,582,350. Hugh W. Sanford, Knoxville, Tenn. April 27, 1926. Filed Sept. 11, 1924; serial No. 737,155.

Spiral Separator; 1,582,503. Adam Benner, Hazleton, Pa., assignor to the Anthracite Separator Co., Hazleton, Pa. April 27, 1926. Filed June 18, 1925; serial No. 37,923.

Self-Adjusting Coke-Oven Closure; 1,580,563. Hermann Müller, Munich, Germany. April 13, 1926. Filed April 25, 1922; serial No. 556,548.

Troughing Conveyor; 1,580,615. Eugene E. Landahl, Crafton, Pa. April 13, 1926. Filed June 9, 1925; serial No. 35,887.

Jig; 1,580,752. George L. Miller, Shickshinny, Pa. April 13, 1926. Filed Feb. 20, 1924; serial No. 694,100.

Drill Bit; 1,580,872. George R. Watson, Waterloo, Ia., assignor to Armstrong Mfg. Co., Waterloo, Ia. April 13, 1926. Filed Jan. 2, 1924; serial No. 684,080.

Method and Apparatus for Burning Pulverized Fuel; 1,581,351. Henry Kreisinger, Pittsburgh, Pa., John Anderson, Milwaukee, Wis. and John E. Bell, Brooklyn, N. Y., assignors to the Combustion Engineering Corp., New York City. April 20, 1926. Filed Dec. 30, 1920; serial No. 433,991.

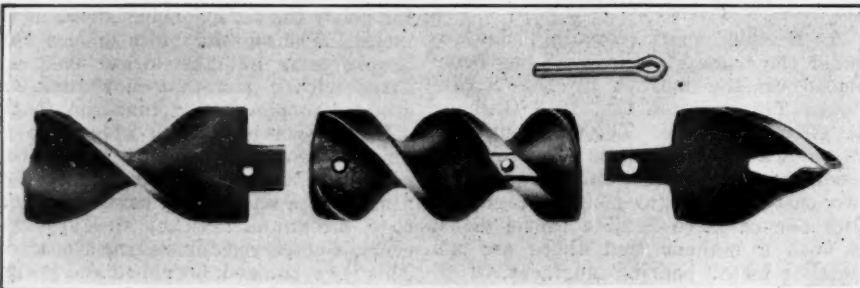
Loading Machine; 1,581,685. Fred Oldroyd, Cincinnati, Ohio. April 20, 1926. Filed Aug. 15, 1923; serial No. 657,600.

Removable Elevator Cage; 1,580,310. Daniel F. Lepley, Connellsville, Pa. April 13, 1926. Filed Sept. 17, 1924; serial No. 738,306.

Association Activities

At a meeting of the Washington Coal Producers' Association held at the Bellingham coal mines early in July, all officers of the organization were reelected. G. A. Tulloch, sales manager of the Bellingham Coal Mines, is president; Prescott Oakes, president-treasurer of the Roslyn Fuel Co. and Independent Coal & Coke Co., treasurer, and W. E. Maltby, secretary-manager. The Washington Coal Producers' Association is composed of the ten largest producing concerns in western Washington. A large number of its members and friends made the trip to Bellingham and were guests of the Bellingham Coal Mines at a novel entertainment 1,000 ft. below the surface of the ground. Music, speeches and refreshments were the entertainment features.

The Broad Top Coal Operators' Association held their annual meeting in Philadelphia July 12, when plans were outlined for broadening the distribution of tonnage from the Huntingdon and Broad Top field of Bedford, Fulton and Huntingdon counties, Pennsylvania. H. H. Lineaweaver was re-elected president of the association; W. W. E. Shannon, vice-president, and W. L. Scott, secretary-treasurer. J. B. Hudson, of Everett, Pa., was chosen a new member of the board of governors.



Point Takes All the Wear

Practically all the wear on an auger drill comes on the point. By making this renewable and of the proper grade of heat treated steel much time and work is saved in the sharpening operation.